

BOOK I (ALTERNATIVE)
THE HOME ISLANDS

WITH ILLUSTRATIONS



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P R E F A C E

“Geography for To-day” was originally issued as a series of four volumes, described as Books 1, 2, 3 and 4, which aimed at providing a considered course in geography adapted to the progressive development of pupils during the four years preceding that in which the School Certificate Examination was taken.

The series has proved popular with teachers, but the Books have frequently been used in a different order from that which was originally planned without any detriment to the progressive nature of the whole. As a result of experience many teachers have asked for an alternative first book dealing with the British Isles, treated in such a way as to exemplify general elementary principles. It is in response to these requests that we have prepared the present Alternative Book 1. This book is primarily the work of Mr. T. Herdman.

The Committee which is named in the previous volumes as having been responsible for the preparation of the whole series is no longer in existence. One of its members died shortly after his retirement from active teaching and another claims the leisure which is due in the years of retirement as a reward for a long and busy career. The present volume has accordingly been edited by the two original joint editors, Professor Stamp and Mr. Suggate, with the assistance of Professor Beaver, who, with Mr. Herdman, was a member of the Committee.

THE PLAN OF THE SERIES

BOOK I. AT HOME AND ABROAD.

A. ENVIRONMENTS AT HOME.

B. ENVIRONMENTS ABROAD.

(Not published separately)

BOOK I. (Alternative) THE HOME ISLANDS.

BOOK II. THE SOUTHERN CONTINENTS.

C. AUSTRALIA AND NEW ZEALAND.

D. SOUTH AMERICA.

E. AFRICA.

BOOK III. NORTH AMERICA AND ASIA.

F. NORTH AMERICA.

G. ASIA.

BOOK IV. EUROPE AND THE BRITISH ISLES.

H. EUROPE.

I. BRITISH ISLES.

BOOK V. THE WORLD.

ADDITIONAL VOLUME. THE BRITISH COMMONWEALTH.

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CHAPTER I

ISLANDS AND CONTINENTS

The Homeland.—Of all the lands of the earth one's own country, the Homeland, should be the best known. As soon as a child begins to take notice of things around him he begins learning about it, and he goes on learning of it as long as he lives. It may be only a small corner that he comes to know at first-hand in this way, but every journey gives a chance to add to that knowledge. Hills and rivers, towns and villages, factories and farms, seen only for a moment from the window of a train or bus, have something to tell to those ready to learn. People met in the home, in the street, or on journeys have all got interesting stories to tell of their homes, their work, and their play. The purpose of this book is to help the reader to put these things into order, so that he can find what he wants when he wants it and what still remains to be discovered is made clear.

To draw a map is one of the best ways both of learning new things and of putting old knowledge into order. Much can be discovered from pictures and many old ideas checked and corrected by their use. For this reason many maps and pictures are included in this book, and what they have to teach can easily be extended by reference to an atlas or to one's own collection of pictures.

The British Isles.—Our homeland is the British Isles. The map shows that they consist of two

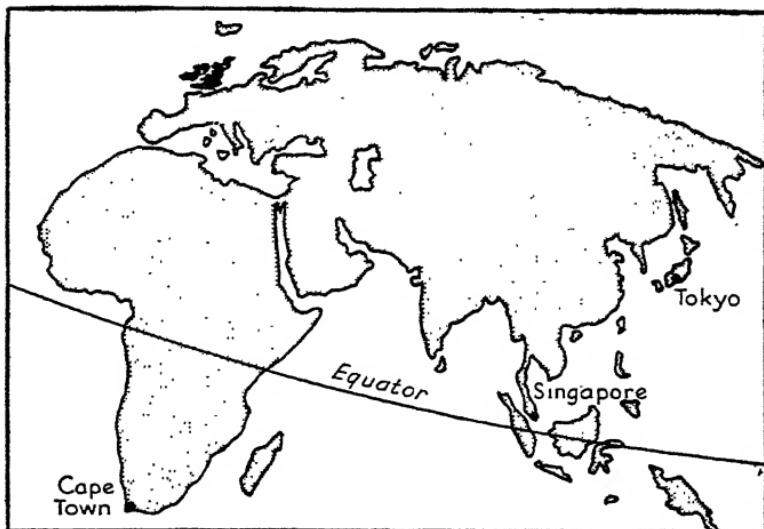


FIG. 1. The Old World Island

Identify three of the archipelagoes shown. In what ways is the position of Tokyo like that of London? What feature of the position of (i) Cape Town, (ii) Singapore, as shown on this map has contributed to their importance as ports?

oceanic islands. Iceland is a good example of this class.

Britain and Europe.—The narrow marginal seas separating Britain from the rest of Europe are the North Sea and the English Channel. If a rectangle be drawn on a map so as to enclose the British Isles, two of its sides will face Europe, to the east and to the south. The other two sides to north and west face great stretches of ocean.

In very early times men learned to build boats in which they could pass to and fro between Europe and Britain. The Romans crossed over to England from the shores of France fifty years before the birth of Christ, and many people had made the

large islands, Great Britain and Ireland, a good many fairly large ones, like Anglesey, the Isle of Man, the Isle of Wight and the Hebrides, and some hundreds of smaller ones. Together they form what is sometimes called an *archipelago*.

Examination of a globe shows that these islands, so important to us, make up but a very small part of the earth's surface. On a globe about the size of a cricket-ball they appear little larger than the head of a pin. A second look will show that the very largest land areas are islands too. The biggest of all is sometimes called the Old World and includes the *continents* of Asia, Africa, and Europe. The next largest, often referred to as the New World, includes North America and South America. The continent of Australia forms by itself the third largest of these great islands. Around the margins of the three main world islands are many groups of smaller islands, and the British Isles form simply that particular archipelago which lies off the north-western coast of the continent of Europe.

The Oceans.—All these lands rise from the floors of the great *oceans*, and people can therefore pass from one to the other only across the seas which cover most of the surface of the earth. Some of the islands are quite close to the continents and so are generally included in them. Thus the British Isles form part of the continent of Europe. Such groups are often called *continental islands*, and the narrow seas which separate them from the larger land areas are called *marginal seas*. That part of the sea bed covered by these seas where they are less than 600 feet deep is known as the *Continental Shelf*.¹ Far out in the oceans are some islands not connected with any continent and usually referred to as

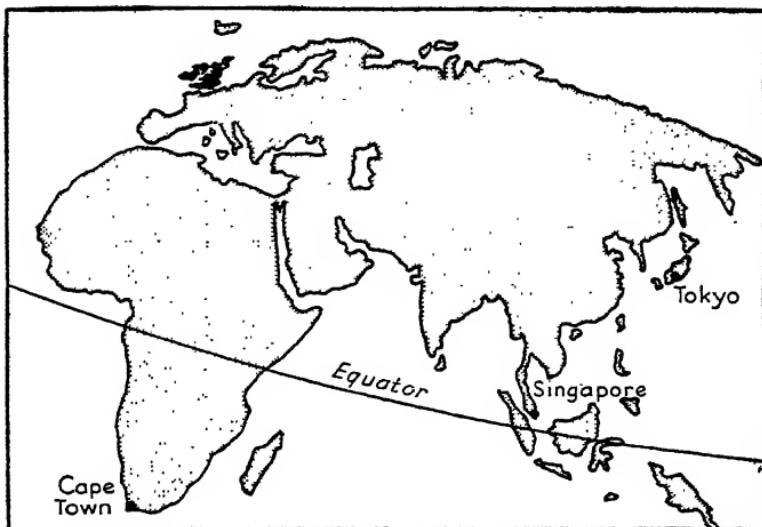


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In very early times men learned to build boats in which they could pass to and fro between Europe and Britain. The Romans crossed over to England from the shores of France fifty years before the birth of Christ, and many people had made the

same journey before that ; but it was not till more than fifteen hundred years later, in 1497, that men crossed the wide stretches of the Atlantic Ocean from Britain to North America. Coming and going from the Continent to Britain, people learned much from one another. Thus Christianity came from Europe to this country many centuries ago ; and when, about a hundred and sixty years ago, English people discovered how to use steam engines in their factories, it was not long before that knowledge spread to European countries such as France, Belgium, and Germany. Merchants have long carried goods across the same narrow seas. Thus the wool from English sheep was spun and woven in Flemish homes six hundred years ago, and the silks and wines of France have been used in England quite as long. In times of war armies have not found it too difficult to cross the same seas. Romans under Julius Cæsar and Normans under Duke William invaded Britain ; and it was Britain's defenders, not her seas, that kept the French armies of Napoleon and the German armies of Hitler from doing the same thing. British armies have crossed in the opposite direction to win victories at Agincourt and Waterloo, on the lands of France, the Low Countries, and Germany. Often when times were troublous on the Continent, people have fled from their homes there and found refuge in Britain.

It is not surprising, then, that the life lived on the two sides of these narrow seas is much the same. Britons and Europeans have similar kinds of houses, wear the same kinds of clothing, eat the same sorts of food, listen to the same kinds of music, and play the same games. There are differences, of course, but these are much less than the differences between

the way of life lived in Europe and that followed in Africa, in India, or in China.

All this coming and going between Britain and Europe has led to the building of harbours for the ships, and ports in which the merchants live and carry on their business. Hull and London on the North Sea coasts and Dover and Southampton on the Channel coasts have for centuries traded with such continental ports as Antwerp and Rouen. British railways in their own steamers carry passengers and mails on the shorter routes, and for this speedier traffic smaller ports, which used to be called *packet stations*, have been established.

Britain and the Atlantic.—To cross from south-eastern England to the Continent is a sea journey of not much over twenty miles and can be accomplished in an hour or two. To cross westward from Britain over the North Atlantic to America is a hundred times as far and takes several days by ship. Not till about the time of Queen Elizabeth I was this journey even attempted by many English sailors, but the wonderful new products the first explorers found there soon led to a rapidly growing trade. Many things that appear quite common to us to-day were new and marvellous to the people of the sixteenth century. The potato was first brought from the Americas, and later became an important crop. Other products could not be grown here, but the old western ports, such as Bristol, and the newer ones such as Liverpool and Glasgow, soon became rich on the tobacco, sugar, and cocoa brought to them in the ships that crossed the wide Atlantic. A little later people began to cross from Britain to make their homes in what are now the United States and the Dominion of Canada. All this was but a

beginning, for when men found they could cross the Atlantic Ocean they ventured over the other oceans. To-day great liners leave these British ports, and Southampton and London too, for all the distant continents. British people travel in them, the British-made goods they carry can be bought in every land, and British shops sell the goods they bring back.

CHAPTER II

SEAS AND SHORES

Holidays by the Sea.—There are few pleasanter places to spend a summer holiday than on the sea coast, and many millions of British folk try to have a little time there each year. The people of some towns—such as Blackpool and Brighton, Scarborough and Llandudno—make their living by providing for these holiday-makers. What attracts these crowds to the coastal resorts ? Many different answers can be given to that question, but most of the visitors would include such things as the cool, fresh breezes from the sea, so pleasant after the hot, stuffy towns, the interestingly different surroundings, and the new things to be seen and done. .

The holiday-maker standing on the shore has behind him the country, with its fields and villages, its roads and railways, its people coming and going about their work or their play. The land is clothed in crops and woods and grassy fields and its surface broken by hills and valleys. In times of storm, shelter is nearly always close at hand, and the traveller can find a roof to cover his head and walls to keep out the wind and rain. At the worst he can find some protection from bad weather in the woods and valleys. In front of the holiday-maker is the unbroken, open sea—empty save for an occasional boat or ship and with no shelter from the winds. It is little wonder, then, that for many centuries men feared the sea and hesitated to trust themselves on



(Photo: D. Herdman)

FIG. 2. The Beach, Aldeburgh, Suffolk

The fishing boat is of a type commonly used on our coasts. How is it driven? Notice the bag-shaped net with its wooden beam by which it is towed and which also serves to keep the mouth of the net open. The coarse shingle is thrown up by storm waves.

its broad waters, and still more centuries before they dared to travel on it out of sight of land.

The Shore.—Where sea and land meet is called the *shore* or the coast-line. Here the contrast between the steady, solid land and the ever-changing, restless sea is very obvious. Wave after wave comes tumbling in, crashing on the beach and flooding over it. On the map we draw a firm line separating the land from the sea, but the visitor to the coast will quickly notice two things the map alone might allow us to forget..

In the first place, the land does not come to an end at the coast but passes under the sea—the waters of the earth cover part of the solid land. Beneath the sea stretches its solid bed. On the beach the waves tumble and rub together the pebbles, and this constant friction produces sand or mud according to



[Fox Photos, Ltd.]

FIG. 3. Chalk Cliff, Broadstairs, Kent

Workmen are cutting back the top of the cliff before making a new path. The old one was destroyed by the action of the waves on the cliff base. How can you tell the photograph was taken near the time of low tide?

the kind of rock of which the pebbles of the shingly beach are made. The retreating waves carry much of this sand or mud out into deeper waters, where it slowly sinks and spreads over the sea-bed. Sometimes the land drops steeply to the beach, forming high cliffs against which the waves break with great force, especially in times of storm. By breaking away the foot of the cliff they often cause great masses of rock from the upper cliff to fall upon the beach, and it is from these masses that pebbles and shingle are formed by the constant action of the waves. There are thus many parts of the coast where it is

quite evident that the sea is destroying the land. This destruction is so serious in some places that the people have tried to prevent it by building great protective walls.

The Tides.—The second fact about the coast-line, not usually indicated on our maps but quickly noticed by the visitor, is that it is constantly shifting its position. People set up their deck-chairs on the sand and settle down to read or to sleep, but in an hour or so they find that the sea has moved up the beach and they must shift back their chairs. Or, again, the children can build their sand-castles in the morning where in the afternoon it may be too deep for them to wade. The sea rises and falls on the beach ; the *tide*, we say, goes out and comes in ; it *ebbs* until low tide is reached and then *flows* to high-tide level. Twice in a little more than twenty-four hours it reaches high-water mark and twice it falls to low-water mark. This strange movement of the sea is very important. When the tide falls after covering the beach it leaves it clean and swept—twice a day the light rubbish is carried out to sea. .

The Coast-line.—The line on the map we term the coast-line indicates, then, where the land passes below the waters of the sea, and though it looks so clear and fixed it is really constantly changing its position as the tide rises and falls and as the waves wear away the cliffs. Though the coast-line of any country is quite characteristic of it, so that we can recognise the country represented from its form, yet some shapes are repeated over and over again on nearly all coasts. To many of these special names are given. Any area of land completely enclosed by a coast-line is, of course, an *island*. If the land forms a long arm reaching out into the sea,

but not quite cut off from the main area, it is termed a *peninsula*. Three other shapes which occur over and over again are the headland, the bay, and the estuary. The *headland* is a pointed mass of land projecting into the sea. Often it is a small peninsula. It terminates in high cliffs at whose feet the waves are busy on their work of destruction. Inland from it there nearly always runs a line of hills. Similar in shape on the map but very different in appearance is the long, low point, or *spit*. The *bay* is a widely curving stretch of coast where the sea reaches in towards the land. It often sweeps inland between a pair of headlands. Here the land is usually low, the cliffs not often more than a few feet high, the sea is shallow near the shore, and the beach wide and often sandy. The *estuary* is easily recognised on the map. It is a V-shaped opening into the land, the coasts on either side gradually approaching one another until they are separated only by the river which flows into it—the shores become, in fact, the banks of the river. The land bordering the estuary is nearly always low and muddy and the rise and fall of the tide makes a great difference. At low tide wide mud-flats, on which nothing heavier than a bird can walk safely, are exposed to view and one must go far out before the water is deep enough to float even a small boat. At high tide all these are covered and the waters come right inland to the grassy meadows. The river brings down fine mud or *silt* and the rising and falling of the tides spread it along the shores of the estuary, thus building up the land. Sometimes they build up a spit or point at the entrance to the estuary.

The Harbour.—At many places around the coast there are to be found small towns which grew

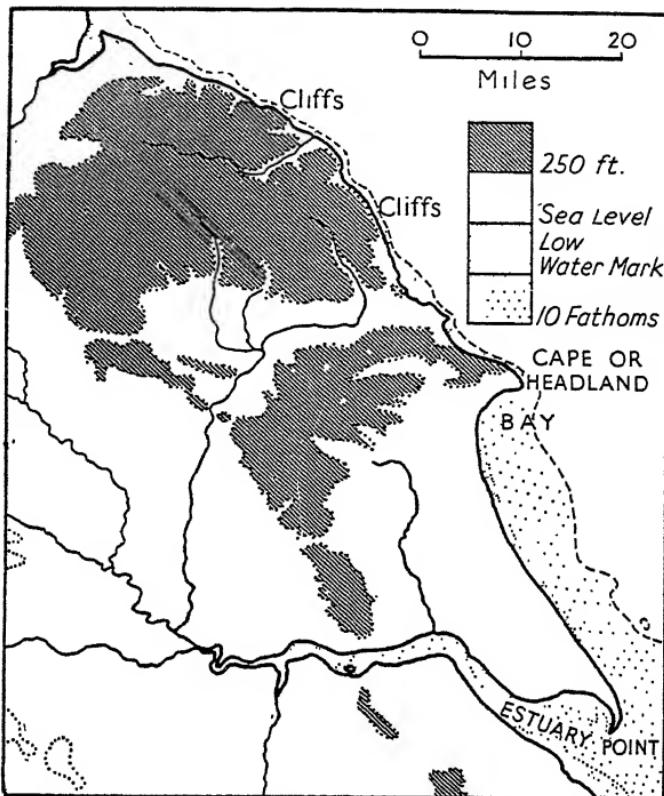


FIG. 4. Coastal Features

Refer to your atlas and then name the features shown. What ports are situated on the shores of the main estuary shown?

up at points where ships used to call to load or to unload cargoes. This could only be done in fairly still waters, and hence these ports developed on coastal openings where headlands or the surrounding islands gave shelter from storms. Such sheltered openings are called *harbours*. In the olden days they were always river mouths or small areas of sea almost enclosed by high land. These were natural harbours. In artificial harbours the shelter



[Photo : *Aero Pictorial, Ltd.*]

FIG. 5. Shoreham Harbour, Sussex

This is a tiny south coast port. What appears to be the chief cargo landed? Identify a wharf, navigation lights, jetties, groynes, and explain the purpose of each.

is provided by piers or breakwaters built for the purpose.

A good harbour is the first requirement for the growth of a port, but many other things are needed to convert even the best harbour into a great modern port. If it is remembered that the purpose of a port is to enable goods to be sent to and received from other countries by ship, some of these things will be evident enough. First of all, the goods to be despatched must be brought from the mines, factories, or fields where they are produced to the port. The nearer the port, then the less the labour. Clearly, too, suitable roads and railways must be

built to transport them, and this is easier in low country than in mountainous land. Here is one reason why the western coasts of Britain, though they have many excellent natural harbours, have fewer great ports than the eastern and southern. Estuaries are especially useful, because sometimes the river can be used to carry goods to the port, and always the valley of the river flowing into the estuary provides an easy route for rail and road construction. Next, the goods are to be transferred to the ship. If deep water can be found close to the shore or the bank of the river, this is not difficult, but nowadays most ships are brought into *docks* for loading and unloading. These are great basins cut into the shore and bordered by very strong walls or wharves. They are deep enough for the ships to float alongside and the wharves are wide enough and strong enough to carry roads and railway tracks and great cranes that unload the goods from the trucks or lorries straight into the ships. The clayey soils and low shores of the estuary are most suitable for the cutting of docks.

On the other hand, all these things would be useless if ships could not reach them. Modern ships are very large and therefore need wide and deep channels in which to float. Harbours which are deep and spacious enough for the largest vessels are not very numerous, but again man can and does improve them by dredging the channels. Breakwaters are built and lighthouses raised to make entry easier, whilst anchored buoys and lightships mark the routes of the deep channels from the open sea to the docks.

Our great ports, such as London and Glasgow, Hull and Liverpool and Southampton, have all

developed on estuaries, and have many docks with miles of wharves for loading and unloading and dredged and marked channels. The ships which use them are of many kinds. Some follow regular routes and run at definite times, and are

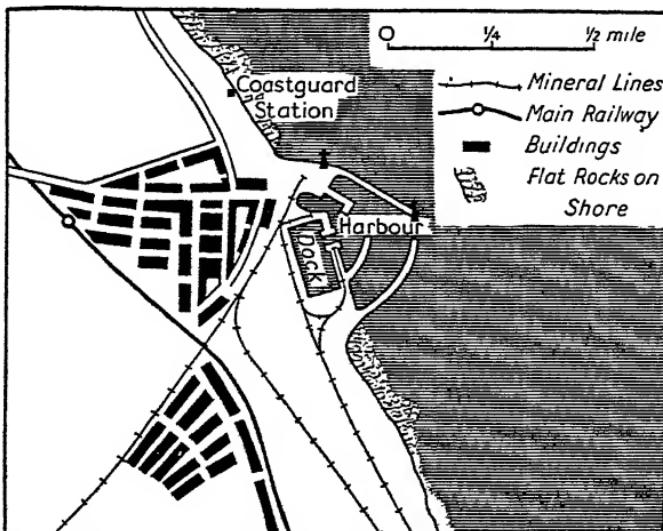


FIG. 6. A Smaller English Port (Seaham Harbour, Durham)

The harbour is mainly artificial. Identify and name the constructions made to help in the working of the port, and show the purpose each serves. What is likely to be the main export of this port and what its main import?

therefore called *liners*, e.g. Cunard liners run from Southampton to New York and Union-Castle liners from London and Southampton to Cape Town and other South African ports. These usually carry passengers and mails as well as goods. *Tramp steamers*, on the other hand, do not follow such regular courses, but carry cargoes to any ports as required by those who hire them. They seldom carry passengers. Some ships are specially built



[Photo : Aerofilms and Aero Pictorial Ltd.]

FIG. 7. Giant Liners at Southampton

Compare the picture with the map on p. 109. One of the larger liners in the world, the *Queen Mary*, has just arrived at the fine new Ocean terminal building which shelters passengers and their baggage and mails when arriving or departing. The express trains run right into the long white building. One of the tugs which helped to ease the liner alongside the dock can just be seen.

for the carriage of particular cargoes, such as the *tankers* for carrying oil and petrol, or the fruit and meat boats with storage space (the *holds*) which can be cooled so as to preserve their cargoes.

The Fishing Ports.—For many centuries coastal-dwelling people have caught fish in the neighbouring seas, and nearly every seaside village has at least a few men who make a living in this way. But a few British ports in modern times have come to carry on this work on a very large scale. Instead of the old-fashioned rowing-boats or small sailing craft of the coastal villages, they send out quite big steam-

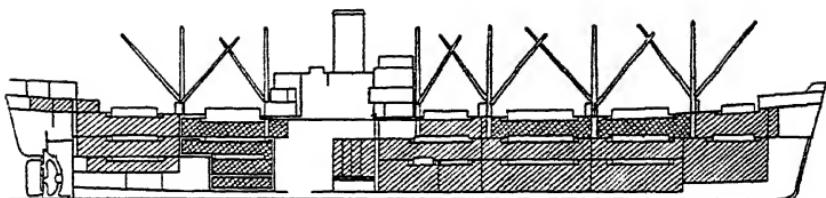


FIG. 8. A Modern Cargo Liner

The diagram shows a section through a ship employed in carrying cargoes regularly between Canada and Britain. It is 500 feet long and 64 feet wide and can carry nearly 10,000 tons of cargo. Shaded spaces are available for this purpose, the cross-hatched spaces being refrigerated for storage of foods.

or motor-driven ships that can travel hundreds of miles to the fishing grounds, stay at sea for some weeks at a time, and return with catches weighing hundreds of tons. Most of these are trawlers, *i.e.* they use great open-mouthed nets which they can drag through the sea or over its bed, and so capture large fish in considerable numbers at a time. Some of the smaller craft are drifters. They steam out to the fishing grounds and there shoot their long nets to capture the shoals of herring or other fish swimming along just below the surface. Their nets are kept upright and prevented from sinking by means of floats. Once these are in the water, the craft does not steam, but simply drifts along with its suspended nets, like a tennis-net half a mile long, trailing slowly behind it.

The North Sea is a great fishing area, and especially the shallower area covering the Dogger Bank, a raised portion of its bed lying east from the Yorkshire coast. Hull and Great Grimsby are the chief ports for this fishery, though many of their trawlers go far farther afield to the cold northern seas off Iceland and Greenland. Yarmouth is the

most famous of the drifter ports, and is very busy in the late autumn and early winter, when great herring shoals are present in the southern North Sea.

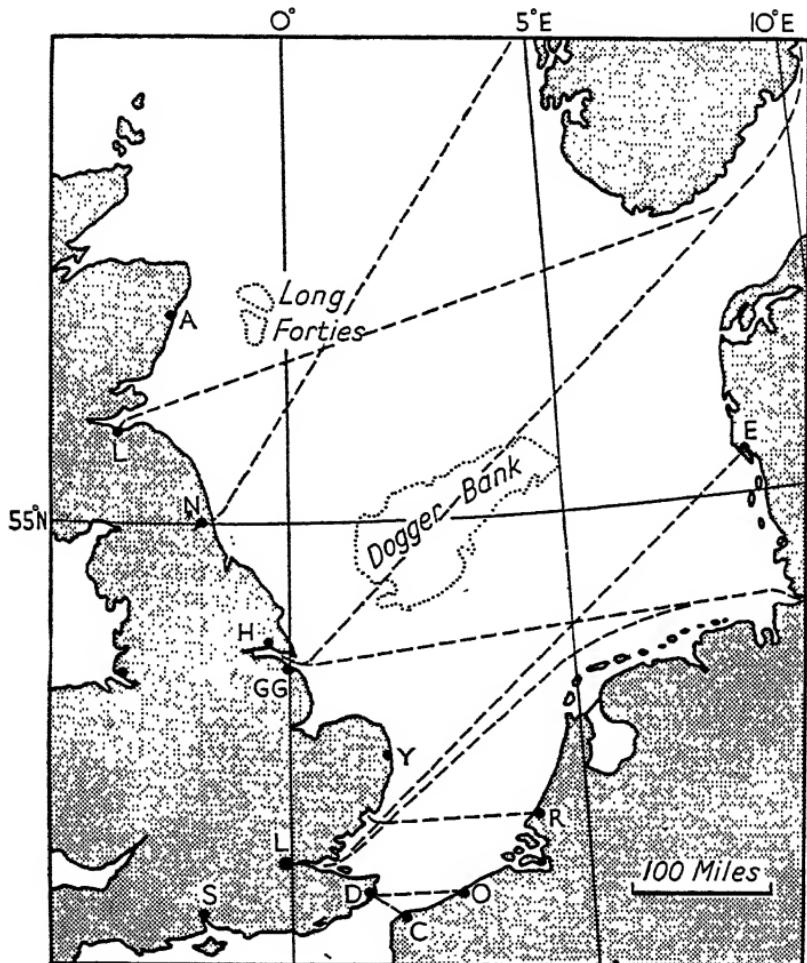


FIG. 9. The North Sea

Identify the ports shown. Three others, important in North Sea trade, are just off the map to the east. Name them. Which of the ports are important in the fishing industry?

Shipbuilding.—The building of ships is carried on in coastal waters, of course, and has long been one of the most important British industries. The hull or body of the ship is made of steel plates first bent into shape and then welded or riveted together. This forms what might be called the skin of the ship. Strong steel girders form the framework inside and the outer plates are bolted to them. Other flat steel plates, laid across and bolted or riveted to the frames, form the decks or floors. The spaces between are divided into holds for cargo, engine rooms, the stokehold for the boilers, and cabins for the passengers and crew. The plates and girders brought from the steelworks are bent and cut and put together in the shipyard. Then the hull is launched, *i.e.* got into the water. To make this possible the land chosen for the yard usually has a gentle slope to the water and is nearly at its high-tide level. A river with low banks or an estuary with low shores is clearly most suitable. The almost empty hull of a newly launched ship is very difficult to control, and hence in selecting a site for a shipyard one would look for a place alongside a sheltered waterway. Thus the Clyde shipyards are well up the Firth, away from the open sea. Those of Tyneside are miles up the river, and those at Belfast at the very head of the Lough.

The hull, once afloat, is towed away to another part of the yard where its engines have been constructed, and these are picked up by giant cranes and lowered into position. On a big ship hundreds of fitters and shipwrights, carpenters and electricians swarm all over her, gradually fitting into place the machinery that will drive her along, handle her cargo and provide light and cooking for her crew and passengers.

Painters and furnishers fit up her cabins ; and slowly she is got ready for sea. Finally, with all her equipment on board, she puts to sea for her trial trip. Every part of her is tested by her builders and checked by surveyors from the firm for whom she has been built. Any necessary adjustments having been made, she is handed over to her owners and is ready for many years' service. Whoever first called a ship " the greatest of the works of man " was not far wrong. Few other tasks call for the labour of so many different kinds of craftsmen or the use of so many kinds of materials. From Clyde and Tyne, Belfast and Barrow and Birkenhead, have gone out ships to fly the flags of nearly every nation and to cross every sea.

CHAPTER III

HILLS AND VALLEYS

The Land Surface.—Almost any view in Britain shows the irregularity of the surface of the land, for most of the country consists of low hills and wide valleys. It is true, of course, that some parts of these islands are much higher than others. Most of north and central Scotland and much of Wales is over 1000 feet above sea-level, while the Scottish Lowlands, central Ireland, and most of eastern and southern England is less than 600 feet above the sea. Generally speaking, the north and west of the British Isles consist of highlands, whilst the south and east are lowlands ; but each of these divisions is broken up by valleys and ridges. There are no wide plains to compare with the Russian steppes or the American prairies, nor are there high, rocky or snow-covered ridges and peaks, like those of the Alps or the Himalayas.

Rivers and Valleys.—Everywhere in Britain there are valleys, and in practically every valley a stream. Rain falls every few days and most of that rain finds its way eventually into our rivers. Seldom do we have long enough periods of drought to cause even quite small brooks to dry up. The high western regions have most rain and the streams carry it down the long slopes towards the south-east. This is why our longest rivers, such as the Tay in Scotland and the Thames in England, flow to the east and south-east. Each stream as it hurries along carries with it

fragments of soil and rock and in times of flood may move quite large boulders or large quantities of shingle. Just as the waves of the sea batter away the cliffs, so the rivers wear away the land surface, each first cutting and then deepening and widening its valley. Though wind and rain have helped, it is the rivers of Britain that have done most to create the irregular surface of our land. The glens of the Scottish Highlands, the dales of the Pennines, and the wide vales of Ireland and southern England are all mainly the work of our rivers.

The Relief Map.—A relief map is one which seeks to show the form or shape of the land surface it includes. Fig. 10 is a simplified map of this kind, on which it is easy to pick out the highlands of more than 1200 feet and the lowlands of less than 600 feet above sea-level. The largest mass of high ground is the Central Highlands of Scotland, separated from the Northern Highlands by the great trench of Glenmore and very much cut up by the valleys of the Tay and its tributaries. South of it and stretching from sea to sea is the area usually called the Scottish Lowlands, though the map shows that it includes a good many stretches of hill country, some of them reaching to over 1200 feet. Next, to the south, lies a belt of higher land, though still less high than the Highlands of the centre and north, and so usually known as the Southern Uplands.

England has no such wide-stretching mountain areas as Scotland, the largest being in the north of the country and consisting of two linked regions, the Pennine Upland and the Cumbrian or Lake Mountains. In the south-west, in the counties of Devon and Cornwall, are two or three small highland masses, of which Dartmoor is the chief.

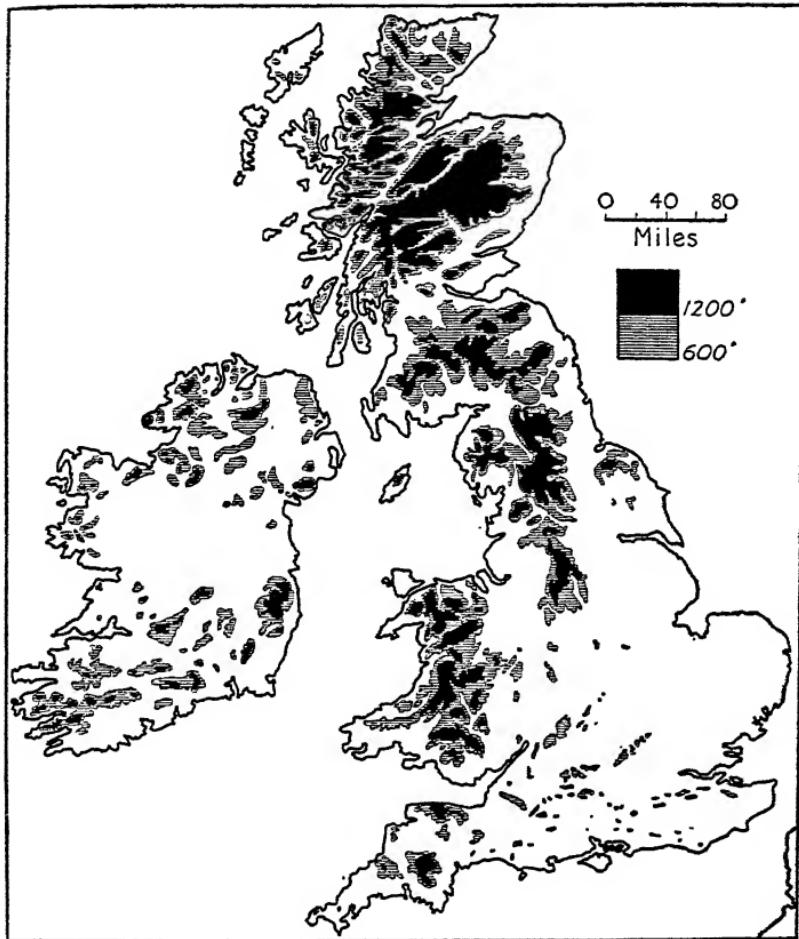


FIG. 10. British Isles—Relief

Wales, on the other hand, has little but highland country, except along its southern edge. The Cambrian or Welsh mountains form a compact mass of high country penetrated by the upper valleys of the Dee and the Severn and some of the tributaries of the latter. Ireland has its highland masses

mainly around its coasts, especially in the north-west and the south-west, leaving the great Central Plain in the middle.

South-east England shows a characteristic feature which is not present elsewhere—the long, low ridges of the Chalk Downs and the line of hills stretching from the Cotswolds to the North York Moors known as the Jurassic Heights. The striking thing about these is their length in comparison with their width, *i.e.* they are simple ridges rather than upland masses. Another feature is the difference between their two slopes. One side is usually a gentle slope and the other quite steep. These two characters mark them out as *escarpments*. The Thames flows from the Jurassic escarpment across the Chalk escarpments, whilst the rivers flowing to the Wash drain most of the land between them.

The Highlands.—The highland areas of Britain consist generally of numerous ridges, with flattish tops and steeply sloping sides, separated from one another by rather deeply cut valleys. The summits are colder than the valleys, for they are exposed to winds from all directions. In winter snow falls much earlier in the year than on the bordering lowlands and it stays far on into the spring. Even in summer small patches can sometimes be found in hollows that the sun has failed to reach, but we have no true snow peaks. The cold winds prevent the growth of trees on these exposed hill tops. When neighbouring valley slopes are covered with woods these grow thinner as the summits are approached and only bowed and twisted single trees grow near the top.

These flattish, wind-swept, and treeless upland areas are termed *moorlands* or *fells*. The tough,



[Photo: "Times"]

FIG. II. Winter on the Pennines

Why is the flock being brought down from the moorlands? Note the fewness of the buildings and the mortarless stone walls instead of hedges.

woody-stemmed heather, with its tiny leaves and fragrant, pinkish blossoms, is the most common plant, and it covers many thousands of acres of the Scottish and Pennine moors. Where conditions are less bleak, wide stretches of bracken sometimes occur. Much rain falls on these high areas, so that the flatter hilltops are often boggy. Sedges and coarse grasses grow on these wetter soils and water-plants in the shallow pools. The decaying stems and leaves of the latter sometimes accumulate to form beds of spongy peat, which, when cut and dried, provides a fuel which the hillfolk can use instead of coal.

The bleak weather, the peaty or stony soils, and the steep slopes make ordinary farming quite

impossible. Both cattle and sheep of the hardier breeds can find sufficient pasture, however, and large numbers, especially of the latter, are reared. The shepherd is the typical inhabitant of the moors, and the moorland farmer is more shepherd than anything. Many of the towns near the hill-country are noted for their sheep fairs, when thousands of the animals may be sold in a single day—some to the butchers, some to be fattened on the richer grass or crops of the lowland farms before slaughter, and others to travel still farther, maybe even to Australia or South America, for breeding purposes. The summer wool sales are also important events for the hill farmer. The cattle he rears are mainly young bullocks intended for beef, for he is too far from the big towns to sell much fresh milk.

In a few districts the hills rise so high that even moorland plants can scarcely live. Wind and rain and frost and the steepness of the higher slopes prevent the accumulation of soil, and the bare rocks stand exposed. Here the hill outlines are more varied and more attractive. Steep cliffs and bare pinnacles of rock take the place of the rounded outlines, flat surfaces, and vegetation-covered slopes of the moorlands. Snow lies for many months in the crevices and frost breaks the rock into sharp-edged fragments. This kind of country is found in the higher regions of the Scottish Highlands, in the Lake District of Cumberland, and in the Snowdon area of North Wales. It offers no kind of livelihood to man, but it is fine holiday ground. Rock-climbers and less hardy ramblers find health and fun in scrambling over the rocky slopes or sporting on the snow-covered hills in winter, or simply admiring the wide views from the summits.

In all the highland areas there are few people, for there are few ways of making a living. Most of such people as are found there make their homes in the valleys, where the lower ground, being more sheltered and less steep, allows some crops to be grown. Hay is often an important crop for the feeding of cattle, especially in these days when the motor-lorry and the valley road together make it possible to send milk very quickly to the railway and then on to distant towns. Hotels and boarding-houses in the villages provide for summer visitors—those who find pleasure in fishing in the rivers and lakes as well as those who make for the hills.

The water draining from these sparsely peopled heights is often clear and pure, as it cannot be in densely peopled mining or industrial areas. In some of the valleys artificial lakes or *reservoirs* have therefore been made, by throwing a great wall or dam across from slope to slope. The water so trapped is conveyed by pipes to thickly peopled districts. Thus Manchester draws most of the water it uses from Thirlmere, a lake in the Cumbrian Mountains; both Liverpool and Birmingham draw much of their supply from central Wales; and Glasgow from Katrine, a lake or loch in the Highlands of Scotland.

Valleys and Lowlands.—The narrow valleys of the highland country soon broaden out as they are followed towards the sea, and the streams draining them unite to form larger and larger rivers. The ridges between decrease in height as the highlands give way to uplands and these sink to the still lesser heights of the lowland country. Often the streams flowing into a single river form a fan-like pattern, the tributaries forming the ribs of the fan and the main stream, or its estuary, the handle. The whole

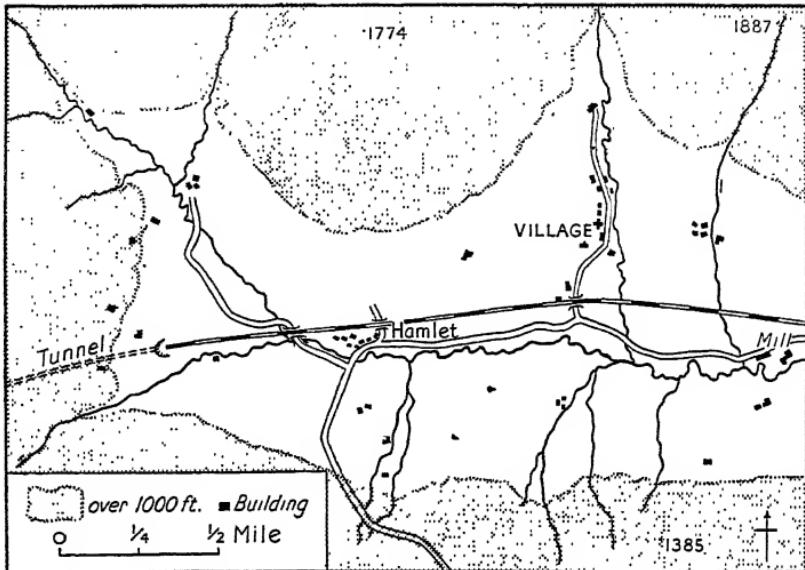


FIG. 12. Map of a Pennine Valley

This is the valley shown in the picture on page 29. Why are the buildings and roads nearly all in the unshaded portions?

area drained in this way by one river and all its feeders is called the *basin* of the river, and its boundary termed a *watershed* or water-parting.

The actual water of the rivers comes from the rain which falls over the basin. Much of that rain runs off the sloping surface within the watershed almost as soon as it falls and quickly reaches the streams in the valleys, so that their level rises at once and they may overflow their banks and flood the lower ground near. But much of the rain sinks into the ground and only slowly drains to the valley, sometimes emerging in a spring or springs. It is this underground water which keeps the river still flowing during times when no rain falls. Each tributary stream brings its contribution of rain or



[Photo : W. A. Poucher, F.R.P.S.]

FIG. 13. Edale, Derbyshire

This picture shows the view looking west up the valley in Fig. 12, but includes a much bigger area than the map. The V-shaped lines of trees in the background follow the courses of the two headstreams, the tunnel passing underground just beyond the end of the left-hand branch. Notice the flat surface of the high moorland and the way the valley widens downstream.

underground water to the main river, which therefore grows in depth and width as it approaches the sea.

Where the rivers flow quickly, as in the highland regions or in times of flood in the lowlands, they wear away the beds over which they flow and undermine and tear away soil and rock from their banks. Where their flow is gentler they often spread out this material. On the lowlands, where slopes are very gradual, this frequently takes place, and so instead of the steep, rocky banks of the mountain stream one finds muddy and almost flat margins along the river. These areas are often called river-

meadows. In the damp soil grass grows rapidly in the summer months and cattle find abundant food. Lands of this kind are especially suited to dairy cattle and most of our home-produced milk, butter, and cheese come from such areas. If the lowland area does not slope enough to enable streams to flow freely, the surface will be constantly soaked and the ground marshy or boggy. The great Central Plain of Ireland has many such districts, and the Fens around the Wash and some areas of Somerset are of much the same type unless they have been artificially drained.

Most of the lowlands, however, are above the level reached by floods and have slope enough to carry off the surface water. These gentle slopes with good drainage form the farmlands of Britain. It is such lands that the farmer ploughs and sows. They provide his crops of corn and hay, turnips and potatoes, and on them his sheep and cattle fatten for market. Where the soils are rich and easily worked, market gardens flourish and on the sunny slopes are the orchards which supply our apples and cherries.

The making of roads and railways is generally easy in the lowlands and towns and villages can spread over the land. Thus these are the busier and more thickly peopled parts of the country. Very few small towns and no large ones in Britain occur in the lands over 600 feet above sea-level. Many are situated where a river can be crossed by bridge or ford (as London, Glasgow, and Gloucester), whilst others are where streams unite (as Reading and Oxford). In olden days boat traffic along the rivers brought trade to some riverside towns, such as those along the river Trent, but to-day road and railway



[Photo: Val Doone]

FIG. 14. The Plain of Somerset seen from the Mendips
near Cheddar

Much of this plain was formerly fenland but is now drained and largely rich pasture or cultivated land. In the foreground is the entrance to Cheddar Gorge.

carry nearly all the goods from place to place, and so towns tend to grow up in the lowlands where these routes meet and cross.

CHAPTER IV

SUNSHINE AND SHOWER

The Weather.—Few things interest people more frequently than does the weather. The first question asked on waking is often, What sort of a day is it ? and last thing at night one wonders, What will it be like to-morrow ? Will it be fit for games ? Need I take my coat ? Shall I cycle or go by 'bus ? Such, and many more, are questions whose answers depend on the weather. It is doubtful if anything affects us so much in our daily life.

To describe the various kinds of weather every language has a great many words, but the descriptions generally refer to the same few main facts. "Hot," "warm," "cool," "cold," "frosty" and many others all deal with the degree of hotness or coldness, *i.e.* with *temperature*. Another group deals with the form and amount of the moisture that sometimes comes from the air on the surface below, and includes such terms as "rain," "mist," "fog," "snow," "hail," "dew," and "hoar-frost." These are all forms of *precipitation*. Then there is the group describing the movements of the air, the *winds*, according to their strength and direction. Yet another refers to the appearance of the sky, whether it is overcast, *i.e.* completely covered with cloud ; or cloudy, *i.e.* partially covered ; or clear, *i.e.* without cloud. But all these terms alike refer to the condition of the atmosphere, for that is what we really want to know when we ask, What sort of weather is it ?

Accurate observations of all these conditions are regularly made at Government-controlled stations in most lands, and officers on ships at sea and private individuals at home collect information to supplement the official records. It is from such information that the Air Ministry officials draw up the Daily Weather Report broadcast every day. By a careful study of it they can issue, twelve or twenty-four hours in advance, forecasts of what the weather is likely to be. Such forecasts are particularly valuable to aeroplane pilots, ships' officers, and farmers. Simple records are kept by many schools, and it is good fun to try and forecast the local weather from them.

The Seasons.—In this country the weather changes very quickly and very frequently. A cold north-easterly wind with sunshine and keen frost in the morning may give way to a mild south-westerly wind in the afternoon accompanied by rain, fog, or mist. British weather is notoriously changeable, yet at the same time a year's records will show the same broad changes in the same months, year after year. These changes are particularly noticeable in the case of temperature, and the year is divided into four *seasons* on this basis. The winter season is the period when average temperatures are lowest; the summer season that when they are highest; spring when they are generally rising and autumn when they are falling. Everyone knows that these temperatures are affected by sunshine. Summer is the warmest season because then the sun rises higher in the sky and shines for a longer time each day than in any other period. In winter the daylight hours are short and the sun does not climb very high in the heavens even at midday.

Winds.—Most weatherwise people in Britain watch the wind very carefully, for it has much to do with the kind of weather experienced. Whereas in some lands the wind blows with about the same strength and from almost the same direction for day after

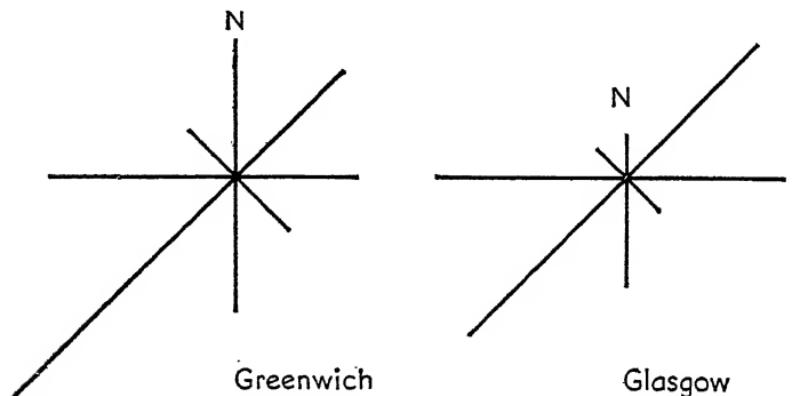


FIG. 15. Wind Directions

The lengths of the lines in these "wind roses" show the average frequency with which the wind blows in each direction. Thus, at Greenwich the wind is more than twice as often south-westerly as northerly; at Glasgow, it is nearly as often north-easterly as westerly or south-westerly.

day, in our own country it frequently changes from a calm or a gentle breeze to a gale in a few hours, and its direction varies just as quickly. It is sometimes said that the prevalent, *i.e.* the most frequent, wind direction over Britain is the south-westerly, but this is not strictly true for all parts of the country, and even in those where it is true it blows nearly as often from other directions. Fig. 15 shows that it is nearly as often north-easterly as south-westerly at Glasgow and even at Greenwich it is not south-westerly much oftener than one day in four.

The simplest wind records, kept for quite a short

period, will show two important facts about the connection between wind direction and weather. If a warm day is succeeded by a cold one it will often be found that it is because the wind direction has changed. West and south-west winds generally bring mild or warm weather ; but north-west, north, or north-east winds generally produce cold conditions. South-east winds are usually not very strong and in summer accompany hot, clear days, in winter very cold frosty weather. In this way wind direction often determines the daily temperature. If the weather record shows rainfall as well as wind direction the second connection can soon be found. It is when winds blow from westerly directions, and especially from the south-west, that we get most of our rainy days ; south or south-easterly winds generally bring dry weather ; north-westerly winds bring most of our heavy snowstorms.

Clouds and Rain.—Rain falls every few days in most parts of Britain and it comes at all times of the year. Just a little more falls in most places in autumn and winter, but the difference is slight. An observer soon finds that there is a connection between clouds and rain. When the clouds gather in the sky we expect rain, and any aeroplane passenger or mountain climber can explain why, for he has been in the heart of a cloud many times. The clouds are made up of tiny droplets of water hanging in the air and carried along with it in the direction of the wind. If these tiny drops run together, or grow larger in any other way, they will fall as rain.

Wet clothes hung out on washday, or roads wet after rain, soon dry. The water in the clothes or on the road surface vanishes. It evaporates or passes into the air, and if that air is moving, *i.e.* a



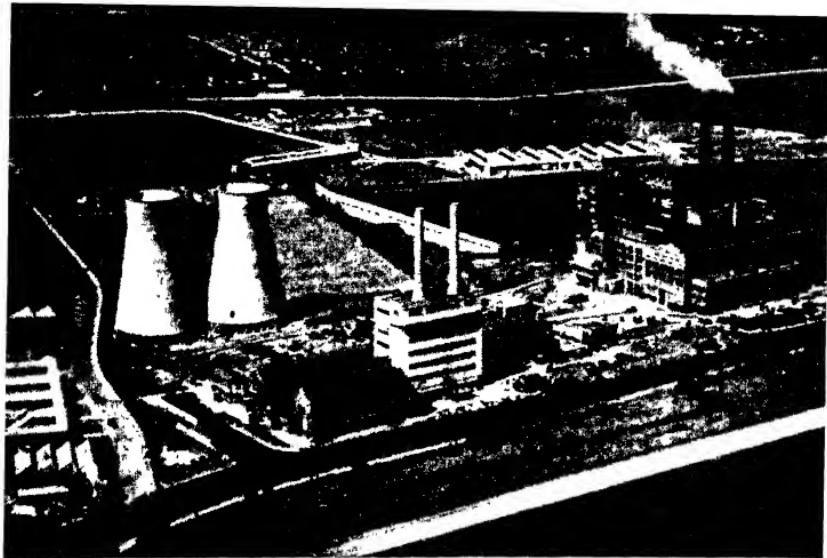
[Photo : D. Peverett

FIG. 16. Storm Clouds

The flat bases of the clouds show the level at which condensation is taking place ; the ragged upper surfaces show how disturbed is the air by upward currents.

wind is blowing, it may soon be carried many miles away. In just the same way, but on a far vaster scale, the moving air over the oceans is constantly taking up water and carrying it far away. The west and south-west winds which pass over Britain contain much moisture for this reason. For many hours, sometimes even days, before reaching us they have been crossing the Atlantic and picking up water from it.

Moist air can be forced to set free some of the water it contains by lowering its temperature. This is termed *condensation*. Clear air will become cloudy if it is cooled enough. Clouds in the atmosphere are the result of the cooling of moist air until condensation takes place. Now, whenever winds are directed upwards the air of which they consist



[Photo : *Aero Pictorial, Ltd.*]

FIG. 17. A Modern Electric Power Station

Explain the direction taken by the smoke. How would you describe the wind blowing when this photograph was taken? What advantages were gained by placing the power station between the railway and the canal?

loses heat rapidly. Sometimes they do this because of great movements in the atmosphere and sometimes they are deflected upwards by an obstruction in their path, such as a range of hills or mountains. Putting these facts together, it is easy to see why west and south-west winds more often bring rain than south or south-east winds and why the highlands of western Britain have more rain than the eastern lowlands.

Under special circumstances other forms of precipitation than rain will occur. Thus condensation in the cold winter atmosphere may produce snow instead of rain; whilst rapid condensation in the intense cold of the high atmosphere, even in summer,

produces hailstones. Fog is usually formed when masses of cold air mix with other masses of warmer, moisture-laden air ; condensation is not sufficient to form rain in this case.

Climate.—The terms “weather” and “climate” are often confused. The difference between them is somewhat like that between a single photograph on a cinema film and the picture seen on the screen as the whole series of such photographs is rapidly shown. The term “weather” refers to conditions as seen at a particular moment ; “climate” refers to the general picture of those conditions over a long period, say a month, a season, or a year. To draw a weather-map of the British Isles the draughtsman needs to know the kind of weather being experienced at a great many places at the same moment, say 7 a.m. on January 1, 1946. For a climate-map he needs records kept daily for many years. What he shows on it is the average of many daily observations.

The Rainfall Map.—The map on page 39 shows the mean annual rainfall over the British Isles. It has been constructed from daily observations taken at many places and continued over many years. It gives a simple picture of the way in which an average year’s rainfall is distributed over the country. Thus it is easy to verify from this map two facts already noted : (i) rainfall is generally heavier to the north and west, *i.e.* in oceanic Britain, than to the south and east, *i.e.* in continental Britain ; (ii) rainfall is heavier in highland Britain than in lowland Britain.

The Temperature Map.—Fig. 19 has also been constructed from observations collected and averaged over many years. The solid line on the map separates those areas where the average temperature on January days was less than 40° F. from those

areas in which it was more than 40° F. The warmer areas are shaded so that they can be easily picked out. They are seen to be the western coastal districts. The shores of north-western Scotland at

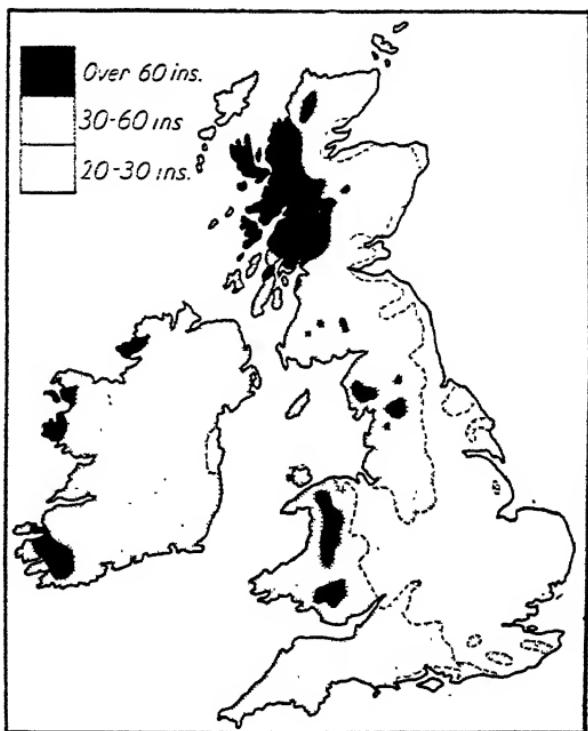


FIG. 18. British Isles—Rainfall

this time of year are warmer and have less frost than those of south-eastern England and the interior of Ireland is colder than any of its seaward parts. The broken line on the map separates the warmer from the cooler areas in July (those over 60° F. from those under 60° F.), and again the warmer areas are distinguished by shading, this time by lines instead

of dots. It can be seen at once that the areas warmest in winter are not those which are warmest in summer. In July it is the south-east regions and

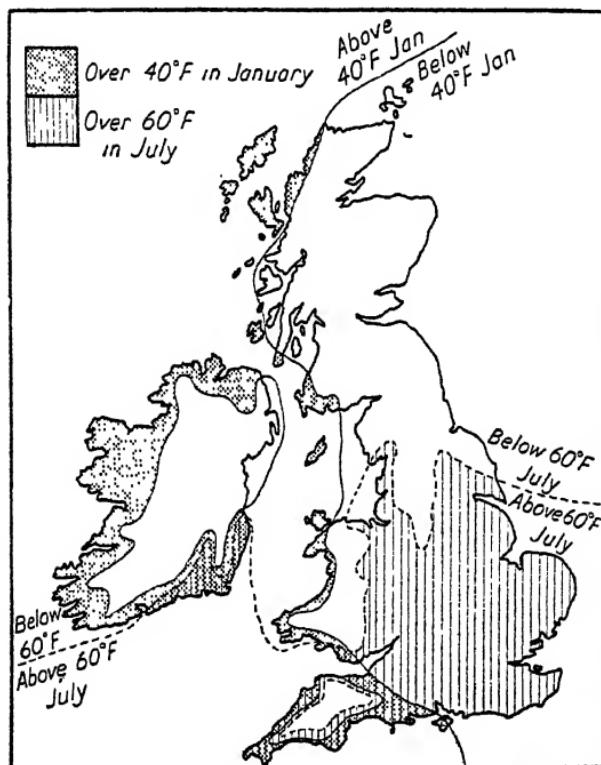


FIG. 19. British Isles—Temperatures

the interior of England which have the highest temperatures and the coastlands that are coolest. It is those same south-westerly winds from the Atlantic that are responsible for this curious state of affairs. Their cool rains check the heat of summer and their mildness keeps off the winter frosts.

CHAPTER V

FARM AND FIELD

The Countryside.—When visitors from the Dominions or from foreign lands come to Britain for the first time they are often surprised by the appearance of the country. They are particularly impressed by three things—the greenness of the landscape, the great numbers of trees, and the many tiny fields. Cæsar's Roman soldiers coming here two thousand years ago were struck in the same way by two of these—the trees and the greenness. The fields are, of course, the work of men; the other features are the result of natural conditions and especially of climate. The mild, damp weather keeps vegetation green and growing nearly all the year. In winter snow seldom covers the countryside for more than a few days at a time. In summer we are seldom without rain long enough for the foliage of tree and field to become brown or yellow.

In ancient days the lowlands of this country were almost entirely covered with woodlands of oak and birch, beech and pine, and thickets of hawthorn, brier, and bramble. The moorlands were much as they are to-day, and the escarpments generally bare of trees but clothed with short grass on their upper surfaces. These together made up what is called the *natural vegetation* of the land. Here and there in the woodlands occurred meadows and glades free from trees and bushes and covered with longer and richer grass. It was on these open, grassy spaces

that early man made his home. Gradually through the centuries he increased the area of the open country and the clearings in the forest by destroying the trees, digging up the bushes, and draining the marshy lands. These cleared spaces form the fields of to-day. Men carved them from the wild country that they might have room to grow crops and pasture animals and thus have more food than the hunting of wild animals and gathering of wild fruits could provide.

The Farmer's Work.—The English landscape as we know it is largely the result of the work of the farmer. That work all through the centuries has taken two forms—the growing of crops and the rearing of animals ; and its main, though not its only, object has been to provide food for the people. As the population increased in numbers the area of the farm-lands increased too and the waste areas decreased. The high moorlands have remained almost untouched and so has much bogland in Ireland. Some small relics of the ancient forests remain and a few patches of heath with poor sandy soils are still left waste. In the industrial districts houses and factories, roads and railways, and waste dumps cover much land and so prevent its use for agriculture.

British crops are of many kinds. The grass of the fields is perhaps the most important of all, though this is often forgotten. Properly tended it gives great crops of hay to be used as winter food by the farm animals. Closely akin to the feeding grasses are the cereals, grasses whose seed grains form an important part of our food. The most important of these are wheat, for flour and bread ; barley for brewing ; and oats, for both human and animal food. Large areas of farmland are given over to the cultivation of root

crops, of which the potato, turnips and swedes and sugar-beet are the chief. Besides these there are the fruits of our orchards—tree fruits like the apple and pear and bush fruits like the gooseberry and the currant family—and all the great variety of garden crops, such as carrots and beans, cabbages and celery.

For the successful growth of crops of any kind two tasks must be carried out by the farmer—the cultivation of the land and its fertilisation. The surface layers of soil are broken up by means of such implements as the plough, the harrow, and the cultivator. This treatment lets in the rain and the air, the frost in winter and the warmth of the sun in summer. It provides a layer of fine soil in which the seeds sown by the farmer can germinate and spread their roots. It also tears up and buries the weeds which would otherwise crowd out his crop. The soil provides the food on which the crops depend. Evidently, then, if the same crop is repeatedly grown in any field, the food its soil contains will be used up in time. Ploughing, by turning up some fresh soil, checks this, but more than that is needed for most crops, and so the farmer supplies plant food to his fields. Decaying plant and animal matter, manure from cowshed and stable, waste from the fish docks and from some industries, and artificial or chemical fertilisers are used for this purpose. Different crops demand different foods, and the exhaustion of the soil can therefore be slowed down by varying the crops grown on a particular field from year to year.

Most farmers, and their wives, devote a good deal of time to the rearing of animals. The horse used to be of first importance because of his value in carrying on farm work, but nowadays he has been

largely replaced by the motor-tractor. Cattle are usually kept. Sometimes the farmer is mainly a cattle breeder, that is, he produces calves for sale to other farmers. Others feed the young bullocks and fatten them for the butcher ; whilst yet others keep cows for the milk, butter, and cheese they provide. The former is generally known as a grazier ; the latter as a dairy farmer. All three need good grassland if their cattle are to do well, the dairy farmer especially needing rich damp pastures with abundant grass.. The grazier will grow crops specially for his cattle, but both he and the dairy farmer will buy meal and cake made from crushed oil-seeds to supplement the grass feeding. Perhaps the most characteristic British farm animal is the sheep. It is better fitted than the cow to feed on the short hill pastures and to scramble about steep slopes, and so is found in all the hilly parts of the country. As we have seen it can maintain itself even on the high moorlands, but that does not mean that better grazing does not suit it. As with cattle, some sheep-farmers are mainly breeders producing young stock for others to feed. Thousands of hill-bred lambs are bought by lowland farmers growing wheat and root crops. They fatten on the stubble and weeds of the wheat-fields, the turnips, and the lowland grasses cropped short by the cattle. They are seldom fed on foodstuffs bought by the farmer. Their woolly fleeces, cut in the early summer, are a source of income to the farmer, and whilst eating off his stubbles and root crops they manure the land for the next year's crop. Pigs and poultry are found on nearly every farm, feeding largely on materials that would otherwise be wasted. They are tended largely by the womenfolk.

The Mixed Farm.—Most British farms combine animal rearing and crop growing, and are therefore spoken of as mixed farms. Some, however, specialise so much on crop growing that they are known as *arable* farms, a name derived from the Latin word for a plough. Those which are mainly concerned with animal raising are known as *pastoral* farms.

The mixed farm consists of a number of fields carefully separated from one another by hedges or by fences of wire and timber. Some of the fields, often those least easy to plough or least worth the labour of doing so, will grow grass for year after year. These form permanent pasture. Others carrying grass may have been recently ploughed and sown with grass seeds. They will be closed to animals in the spring and early summer, until a hay crop has been cut and gathered, and after a year or two will be ploughed again for the production of other crops. Other fields will carry corn crops—wheat, barley or oats; and yet others root-crops, such as potatoes, turnips or sugar-beet; or forage crops for the feeding of stock. The skill of the farmer is largely shown in his choice of crops to suit the soil and other conditions, the proportions in which he grows these crops, and the way in which he fits them in with the kind and number of live-stock he hopes to feed. He must keep enough pasture for the summer feeding of his cattle and sheep and yet grow enough hay and roots for those he hopes to keep through the winter. He must also have enough crops and stock for sale at suitable times to provide for all he needs to buy.

Somewhere in the midst of the fields, probably close to the main road through them, will stand the farm buildings. These will include the home of the

FIG. 20, A, B, C.
Farming
Processes



A. Autumn
ploughing of
stubble.



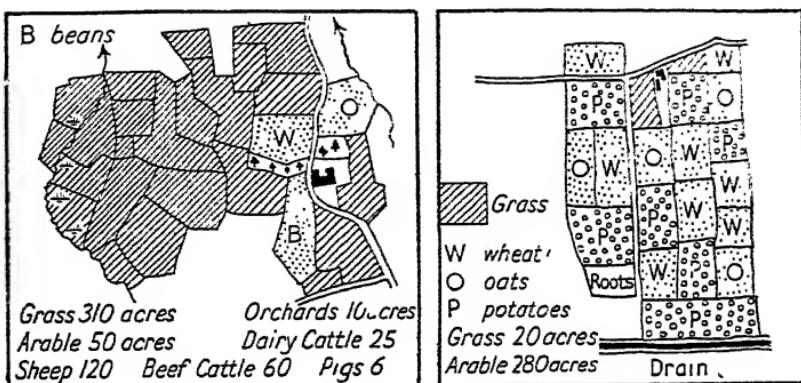
B. Harrowing,
to break down
surface soil, and
drilling seed corn.



C. Harvesting oats
with tractor-drawn
reaper and binder.



farmer and his family and the cottages of some of his helpers. Another block will consist of stables and cowsheds, into which the horses and cows are usually brought for the night and during very severe winter weather. The cows are usually milked indoors, so the dairy is close at hand for the temporary storage of the milk and its conversion into butter and



Farmer A

FIG. 21. Farm Plans

Farmer B

The plans show how two farmers A in Worcestershire and B in the Lincolnshire Fens used their fields in a particular year. Note the great difference in the proportions of grass and cultivated land.

cheese. If cattle are fattened on the farm an enclosed stockyard will adjoin the cattle sheds, and here the young bullocks will feed whilst standing knee-deep in straw that they slowly convert into manure for the fields. Close at hand will be open barns for the storage of hay, granaries for the corn after it has been separated from the straw, storage places for the farm implements, and a garage for lorry and tractor. Here too will be sheds for the poultry and houses for the pigs. Having these buildings close to the farmhouse and well spaced

round the farmyard saves much time and labour. It enables the womenfolk to fit in such jobs as pig and poultry feeding, milking and egg collection with their domestic duties. Sick animals and the young ones, foals and calves and lambs, can also be kept close at hand for frequent attention.

The Market.—Market day usually begins very early at the farm. The morning tasks of feeding and watering animals are hurried through and produce loaded and sent off. If it is not too far, cattle and sheep and pigs will be driven to market ; though nowadays they are largely sent by lorry. Eggs and poultry, butter and cheese are packed into lorry or car and taken along by the farmer and his wife.

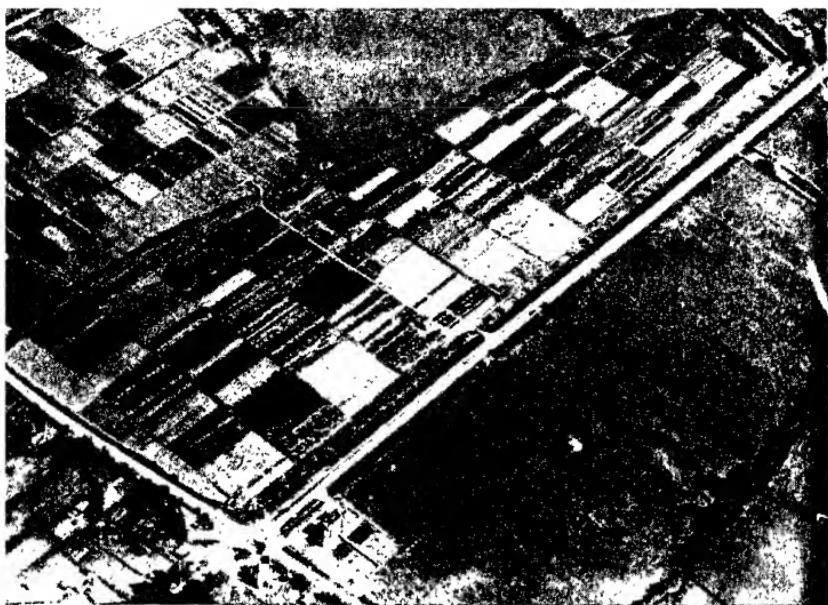
The market town often has an open space along or near its main street where stalls are set up for the sale of small produce. Buyers from the large towns or industrial districts load up their lorries with purchases of poultry and rabbits, dairy produce and fruit. Many of the stalls are occupied by people anxious to supply the farmer's wife with what she needs—kettles and pans and crockery for the kitchen, shoes and clothing for the family and herself, utensils for the dairy and poultry yard. The shops on the main street will be busy booking orders for the week's groceries and for such things as paraffin, tools, and fencing materials.

Close at hand will be the auction mart, where the animals for sale are grouped into pens—small enclosures—as they arrive. Buyers and sellers throng the alleyways comparing the various lots. Presently the auction begins. Each lot is brought into the ring and butchers and dealers bid against one another, whilst the farmer anxiously listens to learn how nearly the price he hoped for will be realised.

Often he will be the buyer of young stock to be fattened for sale or of young dairy cattle to replace his older cows. Often it is worth his while to visit the market even if he has nothing to sell and nothing to buy, for there he meets his fellow-farmers and learns of their successes and failures, of what the dealers are looking for and what they do not want.

In the side streets of the market town are many tradesmen just as interested in the farmer as are the shopkeeper, the auctioneer, and the dealer. Here are the workshops of the craftsmen—the wheelwright ready to supply carts and lorries ; the carpenter to provide gates and woodwork of many kinds ; the harness-maker and saddler ; the blacksmith and garage mechanic.

Other Farms.—In different parts of the country many varied types of farm are to be found. Some specialise in single crops, like the Lincolnshire potato farms, which with their specially suitable soils, very heavy manuring, and skilful working yield very heavy crops. Some, usually small in area, produce nothing but poultry and eggs. Dairy farms specialise in the production of milk, keeping only those types of cow which give heavy yields. Most of their land is in rich pasture fields. They are found in the low-lying parts of the country, where the fields are well watered and the cattle are not exposed to the severe weather of the highlands. They do not trouble to rear or fatten young beasts, but sell off practically all their calves—and they must breed calves, or there would be no milk, of course. In other districts farmers will be found who specialise to some degree in fattening stock, or in rearing young stock, or in growing crops such as wheat and barley, or in fattening or rearing sheep ;



[Photo : *Aero Pictorial, Ltd.*]

FIG. 22. Nursery Gardens, Wimborne, Dorset

What work is carried on here? How does the plan differ from that of a normal farm?

but nearly all these are in some degree mixed farmers.

In the sunnier southern and midland counties of England many cultivators specialise in the production of fruit. Such are the strawberry growers of the Fens and of Hampshire, the plum growers of Worcestershire, the cherry growers of Kent, and the apple growers of Somerset and Hereford. But perhaps the most intensive cultivators of all are the market gardeners. With much expenditure of labour and fertilisers they cultivate the rich soils of a few favoured localities and produce table vegetables in great quantities and great variety. Parts of Kent and Bedfordshire, the Evesham district of Worcestershire, and parts of West Lancashire are noted for

this work. Some of the crops are grown in glass-houses, and many acres of land in the Lea valley, north of London, and to the east of Blackpool are used in this way.

Crop Distribution.—The kind of farming carried on in any district is fitted to the local conditions and especially to the character of the soil and the nature of the climate. The chief corn crops, wheat and barley, are seldom successful in Britain where the rainfall is over 30 inches per year, and they need sunshine for their ripening, so they are found chiefly in eastern England. On the poorer and rainier lands of the west they are often replaced by oats. The western highlands are generally too steep for ploughing and their soils are often poor, but the abundant rainfall and their mild climate make their lower slopes suitable for both cattle and sheep. In consequence they specialise in breeding and rearing young stock. Fig. 23 shows how the main types of farming are distributed over southern Britain. Norfolk and Lincolnshire, Cambridge and Bedfordshire are the counties for crops, with most of the land cultivated and producing wheat and barley, root-crops and market garden produce, and in some areas small fruits. The market gardening area of Evesham and the potato lands of south-west Lancashire are islands of heavy cultivation in the midst of lands given over mainly to grazing. The river valleys and the western coastal lowlands are the chief dairying districts, whilst the low escarpments and their foothills are grazed by beef cattle and sheep and carry crops of wheat and barley where the rainfall is not too heavy.

The north of England and Scotland show the same kind of variation—crops on the eastern lowlands (especially potatoes), with beef cattle, and dairy

cattle on the western lowlands, and sheep and cattle rearing on the higher ground. Ireland has most of its arable farming and cattle feeding in the east,

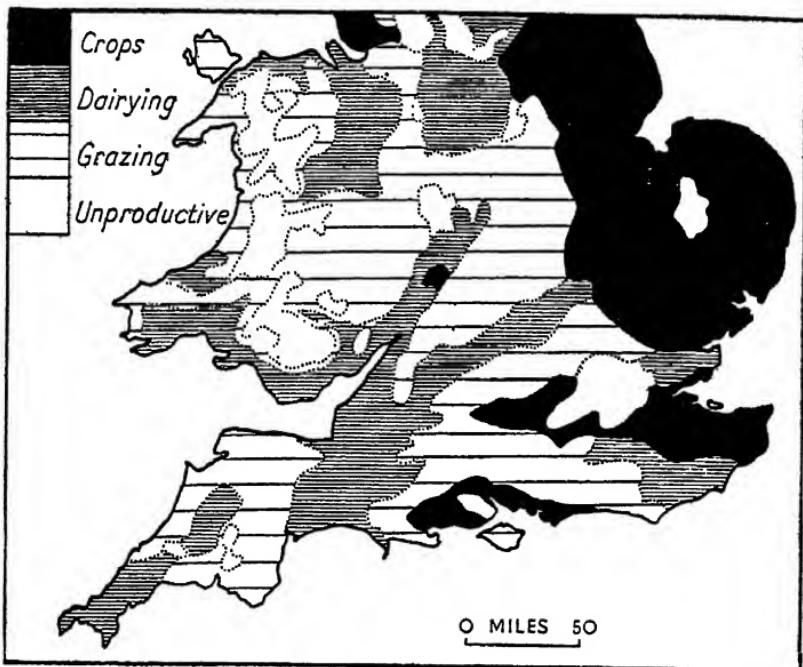


FIG. 23. Southern Britain—Types of Farming

The shading on the map shows the main type of farming in each area. Thus the cultivation of crops is most important in eastern districts, cattle farming—breeding, fattening, dairying—in central and western districts. Two very different kinds of country are shown as unproductive—what are they? Find examples of hill country devoted to grazing; river valleys given to dairying; rainier lowlands given to dairying; drier lowlands given to grazing.

cattle rearing on the northern and central parts of the Plain, and dairying on the southern section and in the wide river vales of the south.

CHAPTER VI

MINES AND QUARRIES

Beneath the Surface.—The farmer is interested only in the soil—the surface layer of the land. What lies beneath it? A deep railway cutting, an open pit or quarry, a cliff on the coast, the bare crests of the highest land—any of these will supply an answer. The soil rests upon great layers or beds of rock. Deep pits and holes bored thousands of feet deep have never penetrated beyond the rock layers into any other kind of substance. The examination of a quarry or cutting in the lowlands will show the soil gradually passing into rock as the surface is left behind. First comes the *top soil*, fine-grained and full of decaying plant material. It is from this layer that the roots of grasses and most farm and garden crops draw the moisture and the plant foods needed for their growth. Beneath it lies the *subsoil*, a mixture of fine material with lumps of rock of varying size. Only the deep-rooting plants, such as trees, reach down to this level. Beneath it comes the *parent rock*, somewhat broken at first, but quickly passing into solid, compact stone, split here and there by vertical cracks down which water penetrates when the soil and subsoil have been drenched with rain.

Often the character of the soil is quite evidently related to the underlying rock. The parent rock has weathered or broken up to form the subsoil and the larger fragments of rock in this layer have been



[Photo : W. Barnes

FIG. 24. Open Cast Working of Iron Ore, Northamptonshire

The "dragline" is stripping off the soil and rock above the bed of ore and dumping it on the left where the ore has already been removed. The power shovel in the trench is scooping up the ore and loading it into the trucks.

crumbled away to form the fine material of the soil. Frost and rain are mainly responsible for this work of destruction.

Some Common Rocks.—Quite often a single cutting or cliff face will show that the rocks are not uniform in character, but lie in beds that differ markedly from one another. Some types are quite easily identified. One of the commonest is *sandstone*, recognisable by the irregular shiny grains of sand produced when it is crushed. Red or chocolate-coloured sandstones are widely found in the Midlands, the Welsh Border, and parts of Scotland, but yellow types are common in other areas, as in northern England; and in the coal-mining areas a white variety often occurs. *Clays and shales* occur

very widely and in great variety. The particles in these rocks are very fine. When wet, and in the case of shales crushed, they form pasty masses which can be moulded or pressed into almost any desired shape. Heating to a high temperature, on the other hand, makes them hard and brittle, and so changes their character that they cannot be again reduced to the clayey or plastic condition. It is these features that give them their importance as the raw materials from which bricks and pottery are made. Slates are rocks which have undergone a similar change in the earth's crust—pressure and heating have together robbed the original shales of their plastic properties. Rocks of the sandstone and shale classes are termed "sedimentary rocks" because they were originally formed from sediments of fine material accumulated through the destruction of the land and mainly laid down under water. *Limestones and coals* are termed "organic rocks" because they have been formed from the remains of living things. Thus in limestones one can often see quite clearly some of the shells or coral masses out of which the rock was made, whilst the shales accompanying coal seams frequently show easily recognisable impressions of leaves and plant stems.

A very different group of rocks—of which granite is a good example—includes all those which were once molten and have reached the surface, or near it, from the heated lower layers of the crust. Such rocks are seen in process of formation in many volcanic regions of the world.

Quarrying.—Rocks are used by man for a great variety of purposes. The surface soil having been removed, the underlying rock is dug out from great open pits or quarries. As the rock is removed the

pit deepens until it reaches the base of the beds of the desired kind of rock. The layers are then worked out horizontally, following the beds and widening the quarry. This is often made easier by the fact that many rocks are found to be split by great vertical cracks or joints, into which the quarry-men can drive their crowbars and so lever away the rock in great rectangular blocks. Limestones and sandstones particularly are often quarried in this way. The big blocks will usually split into smaller masses of the same shape.

Building-stone is obtained in this way. Many of our great buildings, such as the ancient castles and cathedrals, were built from the famous Bath and Portland stones. In some parts of the country nearly all the older dwelling-houses are stone built. To-day bricks are more generally used, because both their use and their production are less costly. The clays from which they are made are quarried from the ground too ; but whereas stone quarries are more numerous in hilly country, clay-pits are usually found in the lowlands.

Limestone is quarried for other purposes as well as for building-stone. When burned in the lime-kiln it yields white, powdery lime for the making of mortar. If crushed and mixed with clay and then burned, cement is produced. Some lime is used for industrial purposes and some by the farmer to sweeten the soil of his fields. The soft, white limestone known as chalk has long been quarried for this latter purpose.

Other important quarry products are rock for road-making, gravel and sand for concrete and mortar-mixing, and iron-ore for smelting in the blast-furnace.

Clay Industries.—As has been seen, clays and shales when crushed with water become plastic, but when dried and heated lose this property and become hard and brittle. An important group of industries has arisen from their use in this way, large quantities of coal being consumed in the process. Brick-making is now a widespread industry, as most of our homes are built of bricks. Coarse clays or shales are ground in mills and water added to make them sufficiently pasty. The plastic clay is then cut or moulded into the desired shape and size, dried for a day or so on a heated floor, and then stacked in great ovens in open piles through and around which the flames and hot gases from coal-fires pass. After a long period of "burning" the bricks are removed and cooled and then are ready for the builder. Roofing and flooring tiles and earthenware drain-pipes are made in the same way. As the clay is more compressed for these, the finished product is more compact. Special grey clays found only in the coal-mining districts give bricks which will resist great heat and are used for lining furnaces. These clays are known as fireclays. Most of the millions of bricks used in building London's houses and offices come from the Peterborough and Bedford areas, where good clay is abundant and the railways from the Midlands and North Country coalfields can bring conveniently the fuel required.

In the North Staffordshire area known as *the Potteries* the higher-grade clay industries are carried on. The local coalfield provides both the fuel needed and the fireclay for the furnaces. Other local clays give the raw material for making coarse earthenware vessels and close by in Cheshire are supplies of salt for glazing, that is covering the

surface of the earthenware with a shiny and non-porous skin. Skilled potters through long years developed methods of manufacture and found superior materials, which are now used in the making of china. For this trade materials have to be brought from many districts—bones from the Argentine meat factories, fine china-clay from the Cornish clay-pits, flint from the chalk quarries, and a variety of other things needed for glazing and colouring.

Coal Mining.—Coal is much the most important of all British mineral products. It was formed by the accumulation of vegetable matter in great quantities in swamp lands and shallow water, and is found to-day in great sheets or layers in the midst of other sedimentary rocks. Naturally the accompanying rocks are largely shales and clays, for these, being derived from ancient muds, would also be formed in the shallow waters. The grey fireclays are probably the old swamp soils in which many of the coal plants grew. Buried beneath great thicknesses of rock of later formation, the plant deposits lost their woody character, gradually changing into the brittle black substance we know as coal. British coals were formed many millions of years ago, but in some countries there are beds of lesser age which contain brown coal or lignite, a mineral half-way on the road to becoming coal. It is different in colour, earthy in appearance, and often shows quite clearly the leaves and stems from which it originated.

The land area beneath which coal occurs is known as a *coalfield*. Sometimes the layers or *seams* of coal are quite near the surface ; at other times shafts have to be sunk many hundreds of feet to reach them. In such mines seldom more than 3 feet in

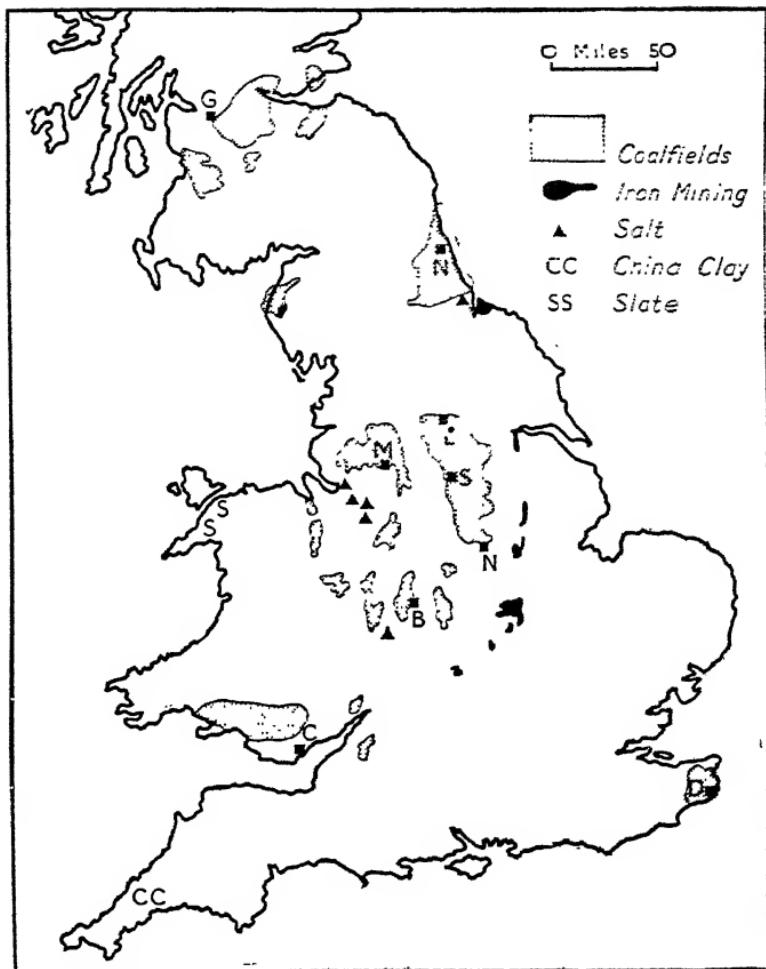
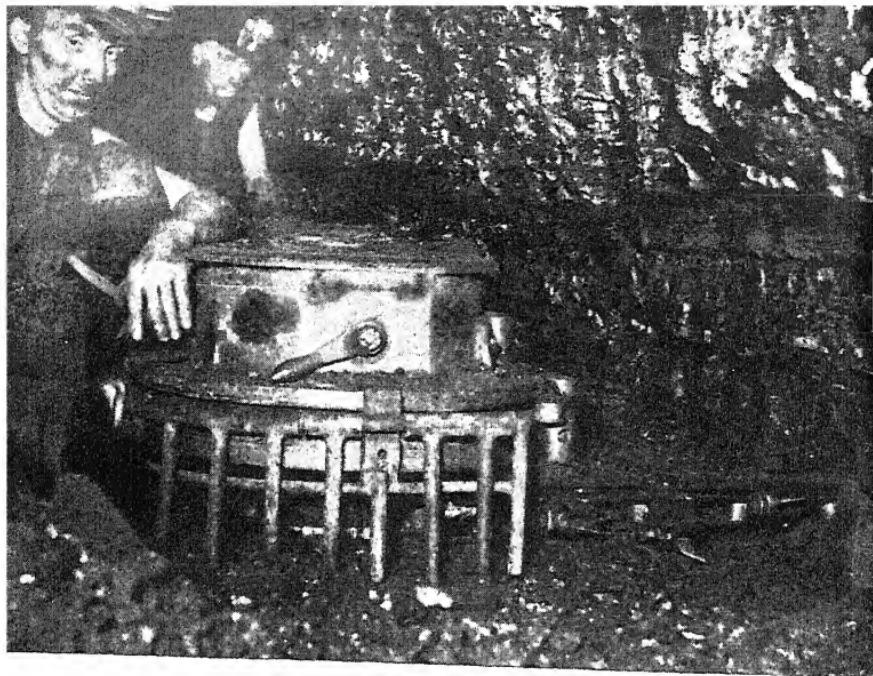


FIG. 25. British Mining Areas

Name the coalfields and the associated towns shown. With what line of hills are most of the iron-mining areas associated?

every hundred consist of coal, and the proportion is often less than half that. The seams themselves vary from the thickness of a pencil-line up to a



[By courtesy of Safety in Mines Research Board

FIG. 26. Coal Cutter in a Northumberland Mine

A long arm extends from the machine beneath the coal face and carries a chain armed with picks. The machine drives this chain so that the picks are carried round and cut into the coal like the teeth of a saw. Note the layering of the coal and the lamps on the miners' helmets.

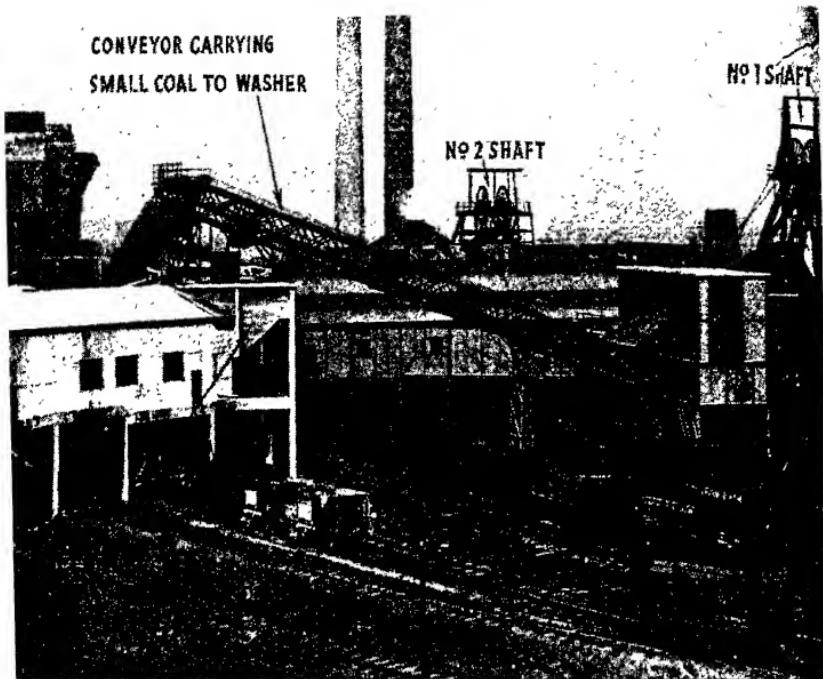
dozen feet or so. Any seam more than 18 inches thick can be worked fairly easily and most of our coal is got from seams between 18 and 48 inches thick.

Seams occurring near the surface have recently been worked in great open pits or quarries. In this open-cast method the surface soil is stripped off and a long strip of the upper surface of the seam laid bare. The coal is removed by mechanical diggers and loaded into trucks for despatch. As each new strip is bared the overlying rock is removed and tipped into the space from which the coal has been

removed. When the soil is replaced and the whole mass settled down, the land may be fit for farming again in a very short time.

Most of our coal seams lie much too deep to be extracted by this method and can only be reached by sinking shafts. These rectangular or circular holes are cut deep into the surface and their sides supported by steel or brick linings. Within the shafts cages are raised and lowered on strong steel ropes, thus carrying workers to and from the different levels and lifting the small trucks of coal to the surface. The coal is obtained by first cutting tunnels into the seam and then cutting away the coal between them. The actual cutting used to be done by hewers, who cut it out with picks or blasted it free with explosives. Nowadays the hewer and his pick have been largely replaced by cutting machinery, and the small pony-drawn trucks of the old days replaced by travelling bands passing over rollers. As the coal is removed the roof has to be supported by means of timber or steel posts ("pitprops") and girders.

The Mining Village.—A single coal-mine employs a large number of workmen, sometimes as many as two or three thousand, and these live in large villages as near the pits as possible. The tall pit-head gear and the spoil-banks of waste rock and earth from the mine rise high over the straight rows of small brick houses in which the miners live. The village school, churches and chapels, the local inns and a cinema—these are the largest buildings, a small park and football ground the only public open spaces. There will be little if anything in the shape of a market—the coal produced mainly leaves the district to be used elsewhere and the miners' wives buy what they need in the village shops.



[By courtesy of Safety in Mines Research Board]

FIG. 27. A Modern Colliery

The coal, in small trucks, is brought to the surface in cages drawn up the shafts. It is screened, *i.e.* sorted into sizes, and large stones picked out by hand. The larger sizes pass through the screens into trucks on the tracks below. The smaller coal is often broken to a fairly uniform size and then passed to the washing plant which removes dirt and the smaller stones. If suitable for the purpose this smaller coal is used for coke manufacture.

Some of the coal is converted into coke before despatch from the mine—that is, it is partially burned in ovens or retorts and the gases and tar it contains are driven off. The coal is first crushed quite small and washed free from stones and clay, and the black, wet mass fed into the coke-ovens. The final product is spongy-looking, but hard, silvery-grey coke, which burns with much heat but little smoke or ash. Its main use is in the smelting of

iron-ore. The gases and tar given off are collected and used in the chemical industry.

If suitable clays occur near at hand or the coal-mine itself yields good fireclay, then brickworks may be built. Other industries needing coal tend to be established on or near the coalfields to avoid the expense of carrying the coal considerable distances. In this way our coalfields have come to be thickly peopled parts of the country. The earliest canals and railways were built to carry coal. They now cross the mining areas in great networks.

The main use of coal is for the raising of steam for many types of engine. Railway locomotives and the boilers of steam-driven ships consume immense quantities and so do the great electric power stations, in which steam power is converted into electricity. Gasworks use thousands of tons, from which they extract the coal-gas for lighting, heating, and cooking in our homes and collect other products like those of the coke ovens. We burn much in our domestic fires, though a smaller proportion than in the days of our fathers and grandfathers. The many industries extracting metals from their ores or converting metals into useful structures or tools all use coal for heating in one form or another.

The Coalfields.—Fig. 25 shows the main coal-mining districts of Britain. Except for the small and deep coalfield in Kent, south-eastern Britain has no coal-mines, nor have the ancient highlands of northern Scotland and western Ireland. Ireland, in fact, has no coalfield of any importance. Generally they occur near the highland margins. Thus Wales has two coalfields, one on the north-east and one on the southern edge of its compact central highland mass. The southern is far the more important.

Similarly, the greatest English coalfields, the Yorkshire and the Northumberland and Durham, occur along the flanks of the Pennine Chain. In Scotland the three major coalfields stretch across the Central Lowlands from the Firth of Clyde to the North Sea. At some points, as in the Cumberland, Northumberland and Durham and Fifeshire fields, the coal seams pass out to sea, and a few mines are actually working coal from such seams, reached by shafts sunk in the coastal districts to depths much below the level of the sea-bed.

CHAPTER VII

FACTORIES AND WORKSHOPS

The Purpose of Industry.—Few of the products of farm or mine are ready for human use when first obtained. Their character has often to be changed completely before they are ready for use. Nature provides the *raw materials*, with or without man's help. It is the work of industry to change these so that they satisfy human needs. A single example will make this clear. In this country warm clothing is necessary to protect our bodies against the cold of winter. One raw material used is the wool of the sheep. This is sheared from the sheep on the farm and sent to factories, where it is cleaned, spun into long threads of yarn, dyed, and woven into long rolls of cloth. In other factories the cloth is cut to pattern, the pieces stitched together, linings and buttons added, and a suit or warm frock produced. All these tasks form part of the wool textile *industry*, they are all part of the process of changing the raw material, wool, into the finished article, a suit or frock. In much the same way the iron and steel industry starting with iron-ore as its raw material, may produce an iron saucepan, a railway locomotive, or a battleship as the finished product. Primitive man used natural products in their raw state. The skin of a sheep might form his clothing, the branch of a tree or a stone his only tools. He spent most of his time in collecting food he could eat at once and suitable objects for his use.

Modern man is rather a maker than a collector of things.

In these processes of changing raw materials man uses his strength and skill, of course, but throughout history he has steadily learned to use *tools* to lessen his labour. At first these were simple things, like the axe, but to-day they are often complicated machines capable of doing skilled and heavy jobs with little need for tiring and heavy work on the part of the worker. At first man applied his own labour to his tools. The axe was of little use without a strong man to wield it. To-day the pushing over of a switch will set to work a vast machine with the strength of many thousands of men. The *power* of the steam engine and the dynamo relieves man of much tiring labour. Industry, then, changes raw materials into finished products ready for use by applying to them human skill and labour, power and machinery. Often it is necessary to bring together materials of different kinds for a single product, and to carry ore or coal for many miles from mine to factory, and always the finished products must be taken from factory to shop and from shop to home. This is the job of the *transport* worker.

Raw Materials.—There are few natural products of which man does not make some use, but some are of special importance. The animal kingdom provides such things as wool from the sheep, hair from the goat, hides from cattle, and silk from the silk-worm. Amongst plant products are timber from the forest trees, fibres from cotton and flax, oils from tree fruits and many kinds of small seeds, and the sap from the rubber trees. The crust of the earth yields coal, the ores from which metals are extracted, petroleum, and salt. These, together

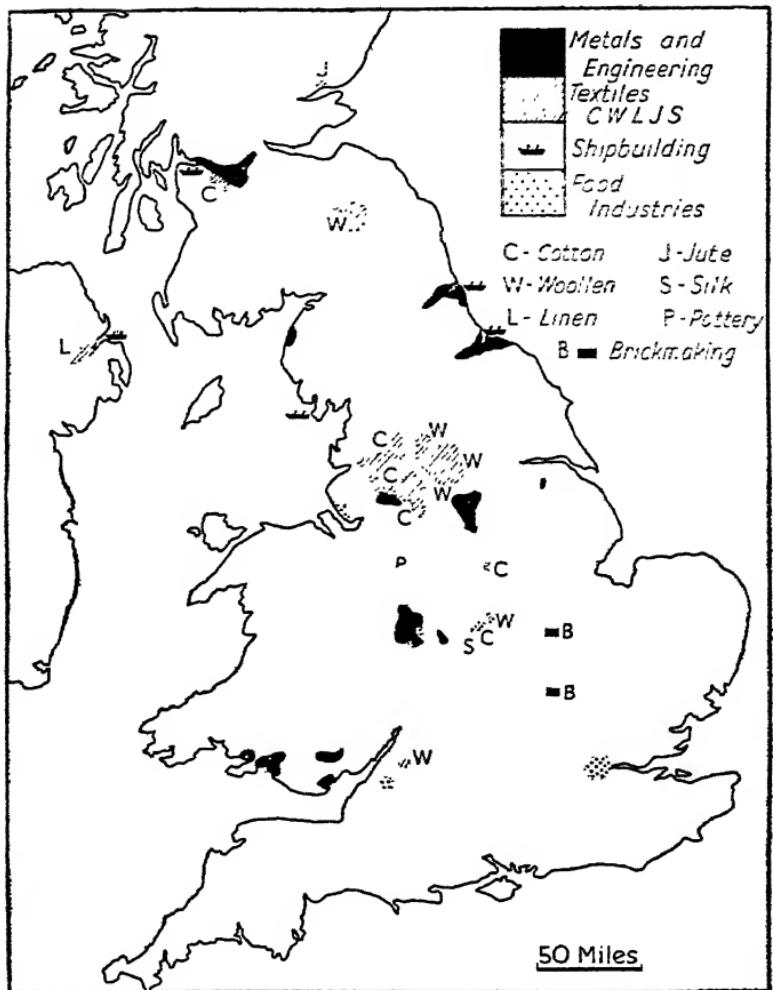


FIG. 28. British Industries

Which industries are not on or near coalfields? What two industries are closely associated with ports? Why? Find from your atlas what important towns are connected with each of the main industries

with those products which are manufactured to provide us with food, form the main raw materials of industry. No single country can supply all the

needs of its people, their factories and workshops. Some which are rich in materials lack the power or the fuel needed to drive the machinery used in their manufacture. Britain, which lacks many important raw materials, is fortunately rich in coal, and thus has become one of the greatest industrial lands by importing such things as cotton and ores, vegetable oils and raw rubber from abroad and manufacturing finished products from them.

British Industries.—The coal from the mines of Great Britain is itself an important raw material from which a host of products is obtained. The *chemical industry* extracts from it fertilisers for field and garden, benzol—which can be used instead of petrol—dyestuffs, nylon, and liquids for preserving timber from damp and rot. Both the doctor and the photographer use fine chemicals obtained ultimately from coal. But its main industrial uses are in the smelting of ores and the heating of boilers to provide steam for the driving of factory machinery. The extraction of iron from its ores, its conversion into steel, and the manufacture of a great variety of products from this steel, all call for the use of great quantities of coal in the form of coke. Together they make up the chief, but not the only one, of our *metal industries*. These give employment to more of our people than any other group of industries, and their products are sent to all parts of the world for sale. Great quantities of cotton, wool, and jute are brought to Britain from foreign lands, and with the wool obtained from our own sheep and the flax grown in north-eastern Ireland provide the raw materials of the *textile industries*. In nearly every town can be found factories busy in some section or other of the *food industries*. They produce such things as

flour, margarine, cocoa and chocolate, sugar and biscuits.

Each industry is carried on where some local condition or conditions especially favour it. Industries needing large quantities of coal for raw material, fuel, or power have mainly grown up on or near the coalfields, where it is plentiful and cheap. Thus we find the iron and steel industries of northern England, of Wales, and of Scotland in the coalfield areas. The linen industry of Belfast has grown up close to the fields where flax is grown. Where the raw material has to be brought from overseas the industry often develops in the port where it is landed. Thus Bristol has both cocoa and tobacco industries and the south Lancashire cotton industry has grown up near the ports of Liverpool and Manchester. The food industries, on the other hand, are mainly carried on close to big cities, for it is the people of these places who need large quantities of the biscuits and sweets, cereals and meats they manufacture.

The Textile Industries.—The textile industries take the fibres from plants or from the coverings of animals and convert them into fabrics. This is done in two stages. In the first, or spinning stage, the fine, short fibres are combed out and then twisted together to form fine threads or yarns. In the second, or weaving stage, a great number of strands of this yarn are stretched lengthwise and then a second series is crossed under and over the first to form a continuous length of cloth. Patterns are produced on the fabric by using yarns dyed to different colours or by printing on the finished cloth.

The cotton trade is the most important branch of the British textile industries. It is almost entirely carried on in south-east Lancashire. The



[Photo: "Times"]

FIG. 29. A Smaller Yorkshire Factory Town

The photograph was taken late on a winter afternoon. The lighted buildings are textile mills and sheds. Notice the position of the town in a valley overlooked by a spur of the Pennines.

fibre is found as a fluffy mass attached to the seeds of a plant which grows in sub-tropical lands, and is brought to Liverpool from the United States, Egypt, and India. The factories are situated in a whole series of towns, such as Oldham and Bury, all within a few miles of Manchester. The local coal-field provides the steam power for the spinning and weaving machines. The chemical factories along the lower Mersey supply the bleaching materials to whiten the fabrics and the dyes to colour them. The streams from the Pennine hills give plenty of clean, soft water and the winds from the sea keep the air moist, an important help, since it lessens the chances of breakage of the cotton yarn during the spinning and weaving processes. The finished cloths are often sent abroad in rolls containing many yards

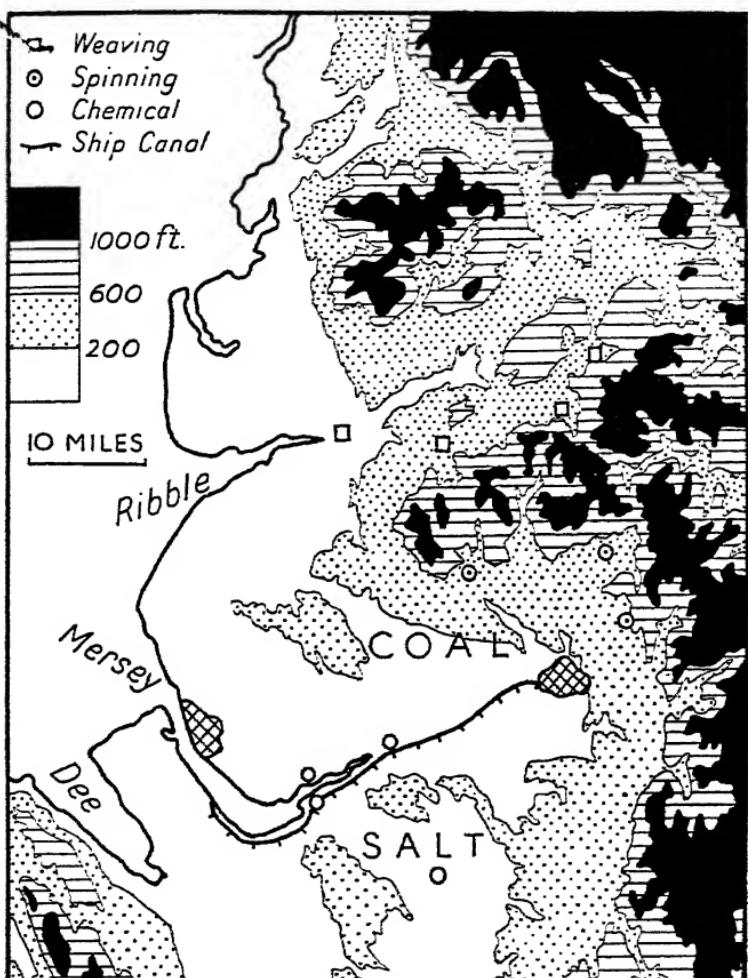


FIG. 30. An Industrial Area—South Lancashire

Note the three groups of towns—chemical, spinning, weaving. Why are they in separate areas? Find from your atlas the names of towns in each of the three groups. What important factors in the cotton industry are *not* shown on this map? What other industries are important in this area? Cheshire and West Lancashire are important agricultural regions. What are their chief products and where are they mainly consumed?

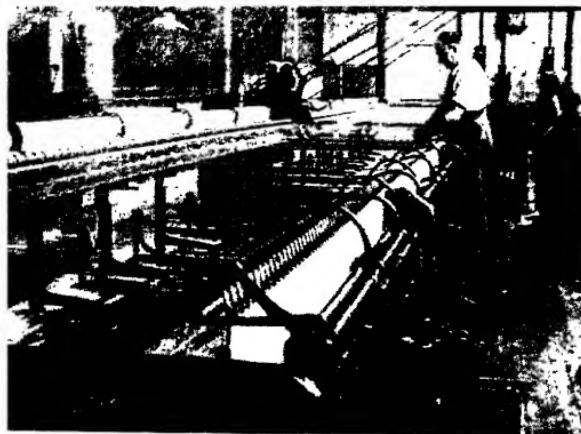
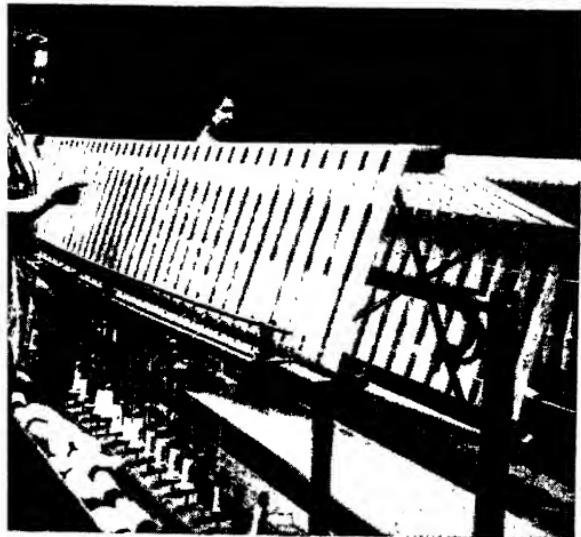


FIG. 31, A, B.
Processes in Wool
Textile Mills

A. A spinning process
—twisting and stretch-
ing to make a finer yarn.



B. Reeling yarn.



C. Preparing for weav-
ing—passing hundreds
of threads of the right
colours and in the right
order, one by one,
through tiny sockets on
the loom.

of material, but many local factories are employed in making them up into sheets, handkerchiefs, garments, and similar products.

The West Riding of Yorkshire is the main area for the manufacture of fabrics from wool. Originally it used the wool of sheep fed on the Pennine moors and drew its power supplies from the local rivers. Now it supplements home supplies with large quantities drawn from Australia, New Zealand, South Africa, and Argentina, and for power depends on its local coalfields. Here again a group of towns has grown up, including such places as Halifax and Huddersfield, with Leeds and Bradford as the main centres. As in the case of the cotton industry, much of the finished cloth is sent abroad, but a large proportion is kept for home use, and much of this is made up into garments in the Yorkshire towns.

The linen industry, of which Belfast is by far the most important centre, not only in Britain but in the whole world, is like the woollen trade in that it depends partly on locally grown flax and partly on fibre imported from other lands. The jute manufacture of Dundee is, on the other hand, more akin to the cotton industry in that it depends altogether on an imported plant fibre obtained from the delta lands of the Ganges in north-eastern India. The coarse fabric made from this substance is mainly used for sacks and wrapping materials.

Other important branches of the textile industry include such trades as the making of hosiery and lace in the East Midland towns of Leicester and Nottingham, of silk fabrics in Cheshire, and of rayon and nylon materials in Lancashire, and South Wales.

The Metal Industries.—All the metals, such as iron and copper, lead, tin, and zinc, are obtained from ores found in the earth's crust. They seldom occur over wide areas comparable to the coalfields, being usually found in relatively small quantities in widely scattered places. Iron-ore is the only one of these found in quantities of much importance in Britain. Most of it is quarried from beds of rock which come to the surface in a narrow belt stretching south from near the mouth of the Tees, through Lincolnshire and Northamptonshire, *i.e.* near the Jurassic Heights. Some iron-ore used to be obtained from the coal-mining areas. Industries using the other metals depend almost entirely on imports of ore or of the crude metal, sometimes from far-distant lands, such as tin from Bolivia, copper from Rhodesia and zinc from Australia.

The first stage of these industries is the extraction of the metal from the ore. In most cases this is done by heating the ore to such high temperatures that the metal flows from it in liquid form and is therefore easily separated from the earthy materials with which it was mixed. Coke, prepared from coal, is the fuel most generally used in these furnaces, and hence the ores are usually brought to the coal-fields for this extraction. The tall blast-furnaces, so called because the coke is made to burn more fiercely by forcing a blast of air through it, are a well-known feature of the landscape in many coal-mining areas. These are used in the extraction of iron. The Durham, South Wales, Cumberland, and Lanarkshire coalfields all take part in this branch of the industry. Aluminium ores need very high temperatures for their extraction and are therefore usually treated in electric furnaces.



[Photo : L. N. A.]

FIG. 32. Steelworks near Swansea

Iron is first melted and converted into steel and then rolled into sheets or rods as required. Notice the many chimneys and the wide area covered by the works. Compare the valley here with that at Porth (Fig. 51). Why are the steelworks near the coast?

The metals thus obtained are usually impure, and have to be remelted and treated to get rid of these impurities before they can be used for manufacture. This process is termed refining. Imported metals are often in the crude state and have to be passed through this stage. Most of the iron from the blast-furnace is not only refined but treated at the same stage so as to convert it into steel—a much more generally useful form of the metal.

The metals from the refining furnace are usually converted at once into the forms in which they will eventually be used. Thus if the molten metal is run into appropriately shaped moulds and allowed to cool it will harden into any required form. Many

articles are produced almost ready for use by this casting process. In other cases the metal is allowed to cool just enough to solidify and then passed through shaped rollers which form it into sheets of any required thickness or into rods, which may be square or circular or of almost any desired cross-section.

Other branches of the industry take the products of the foundry and the rolling-mill and make them into finished articles. Thus the sheets may be cut and pressed into all kinds of forms, from saucepans to complete motor-car bodies. The rods may be drawn into tubes, or cut into lengths and converted into bolts and screws. The bridge-builder and the shipbuilder use the larger girders and plates of steel, the electrician the finer wires, the hardware maker the thinner plates.

The Food Industries.—The factory worker and the town dweller can do little to provide for their own needs in the shape of food. They must obtain what they require from other people in other districts, and it is therefore necessary to treat these foods in such a way that they can be kept and transported without their becoming unfit to eat. In some cases the treatment is relatively simple, as in the milling of wheat to produce flour, the salting of pig's flesh to change it into bacon, or the smoking of herrings for kippers and bloaters. The making of margarine is a more complicated process, calling for oils from the tropics as raw materials. As in the other great industries, if the raw materials come from abroad, then the port of landing has great advantages as the place of manufacture. Thus London, Liverpool, Hull, and the Clyde ports have margarine factories, flour mills, and sugar refineries. If they are produced

in the home country, then the producing area is clearly favoured. The orchard districts preserve some of their fruit in tins or as jam ; the market-garden areas dry and bottle peas ; the barley-growing districts have breweries ; the sugar-beet regions have sugar factories.

Some branches of the food industries carry the work a stage further and produce foods ready for eating without any further treatment. Nearly every town of any size has its factories making cakes, biscuits, sweets, or chocolates. In many districts wheat and other cereals are rolled, cooked, and packed ready for the breakfast table. Cooked meats are prepared in a hundred forms. Though these things will keep for a good while, they are all at their best when quite fresh, and are therefore made if possible where they are to be consumed, rather than where the raw materials are abundant. The great cities like London, Birmingham, and Glasgow have thousands of people busy in their factories preparing foods for their fellow-citizens.

CHAPTER VIII

RAIL AND ROAD

People and Things on the Move.—In Britain to-day both people and things seem to be constantly on the move. Night and day ships and trains, lorries and buses are running to and fro over the highways of sea and land, whilst overhead aeroplanes pass on the invisible highways of the air. What is the purpose of this ceaseless movement? To answer that question think for a moment or two of the daily requirements of a British family. Father goes to work by bus or train; mother travels into town to do her shopping by tram or bus; the children go to school by bicycle. The postman brings the morning letters, which have come by air, by train, and by van from far away. The milk has travelled from the farm to the town dairy by lorry and train, and is brought to the door in the milkman's van. Bread and meat and vegetables and coal—all have travelled far to reach our homes. The goods in the shops and the materials and machinery in the factory all have been moved from place to place in their history. No wonder the transport industry, which is responsible for the carriage of all these things, has grown into one of the greatest of all forms of employment.

The Road.—Long ago things could not be carried so far nor so quickly. The hunter took home on his shoulders the game he had slaughtered. The cultivator brought to his hut in a simple basket the few handfuls of grain he needed. No one travelled far

and all went on foot. The earliest roads were mere pathways trodden down where people often passed, as for instance from the hut to the neighbouring stream for water. When men began to exchange the products of one district for those of another, something better was needed, and regular trackways began to cross the country in many directions. One of the earliest of these was used to bring the tin of Cornwall to Kent, and another very early route was followed by those who took salt from the springs in Worcestershire northward through the Midlands. The introduction of the horse as a beast of burden increased the amounts that could be carried and led to the building of simple bridges and the widening of the old tracks. The next stage was marked by the use of wheeled vehicles, wagons for goods and coaches for passengers. It was necessary to widen the old routes where they were suitable and to plan new roads where the trackways were too steep. The ploughing up of the roads by the wheels in wet weather led to the making of macadam roads, so named after their inventor. A firm surface was obtained by forming a solid foundation of large stones and covering this with material broken much smaller and well rolled to give an even surface. On such roads wheeled vehicles could travel much more quickly and carry far heavier loads than on the old earthen tracks. The coming of motor vehicles with rubber tyres has carried these changes much farther. Instead of a string of pack-horses each carrying a load of a hundredweight or two at a speed of about a couple of miles per hour, the modern motor-lorry can transport loads up to 10 tons at speeds of over 20 miles per hour. Roads with concrete or asphalt surfaces make smooth and speedy

travel possible, and much work has been done in recent years in straightening and widening the ~~great~~ highroads and reducing the gradients to be climbed.

The Railway.—When, some two hundred years ago, British factories began to use coal for the smelting of iron-ore and for the raising of steam to drive the machines in the textile factories, the need for some easy means of carrying it became very great. Pack-horse transport was much too slow and costly. Many methods were tried. In south Lancashire a canal was cut to float barges from the mines to the factories. Where both factory and mine were near the sea, coasting vessels were used. The best method was found to be to haul the coal in wagons over specially made roads on which the wheels followed smoothly laid rails. These were the first railroads. In the earliest days the rails were simply long lengths of timber fastened to heavy wooden cross-bars. Soon these were replaced by iron and then by steel rails. By raising the rails a little way above the surface it became possible to use wheels with raised rims or flanges, which prevented the wagons from running off the track. At first the wagons were pulled along by horses. Later, and especially where the tracks were steep, they were drawn or lowered by strong ropes attached to stationary steam engines. Then came Stephenson's invention of the locomotive, a steam-driven engine attached to the trucks and pulling them along behind it as it moved forward over the tracks. This was an enormous step forward, for both the speed of the train and the weight of coal carried were greatly increased. The method was quickly applied to the hauling of other goods and of passengers, and the modern railway system was born.

Choosing the Way.—The railway suffered even more than the road from one great defect—any increase in the slope or gradient of the track cut down both the speed of travel and the load that could be carried. One of the first problems was, then, the choice of a route which avoided steep places. Routes along river valleys were often suitable, because the river avoided steep places too. Flat plains offered no difficulties other than the building of bridges where the railways crossed rivers or roads. But the coalfields are generally in hilly districts, and even in lowland country a route that avoided hills altogether would often be very round-about. Railway engineers have solved this problem of securing an even track on an irregular surface in various ways. A ridge of hills can be pierced by means of a tunnel, so that the track goes through instead of over the ridge. The laying of the track on a ridge of earth, or embankment, can remove the need for running down hill and then climbing again, as in crossing a valley, for example. By cutting a sort of shelf along a hillside other difficulties may be overcome.

Though these and other means are used on most railways, they are all costly and so are avoided whenever possible. The relief of the country still largely determines the way followed by road and railway. This is very obvious if one looks at a map of northern England. The main routes from the Midlands to Scotland run either east or west of the Pennines. The railways that cross Wales to carry passengers, mails, and goods to and from the ports where they can go by sea to Ireland, keep to the lower and flatter ground close to its northern and southern coasts and away from the mountainous central area.

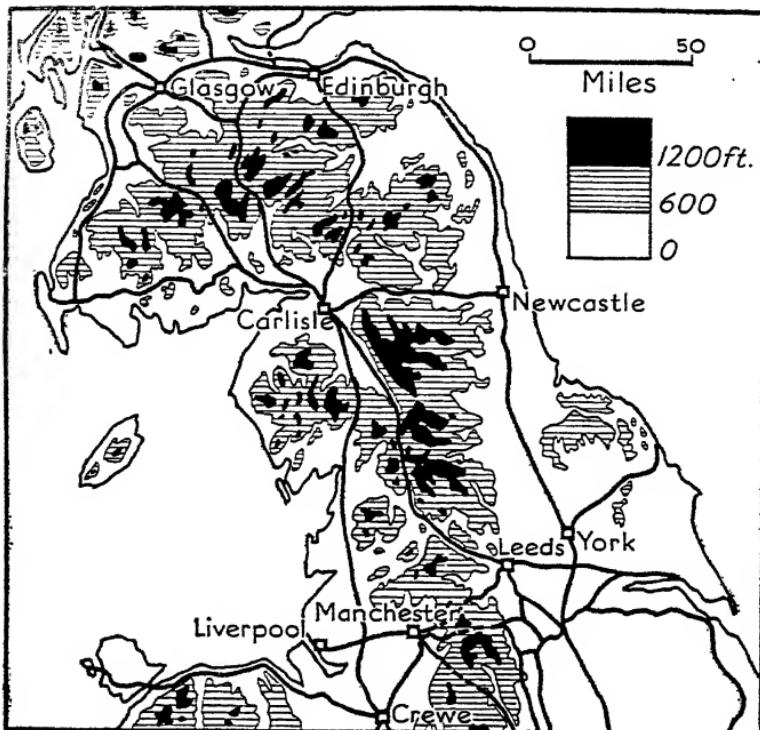
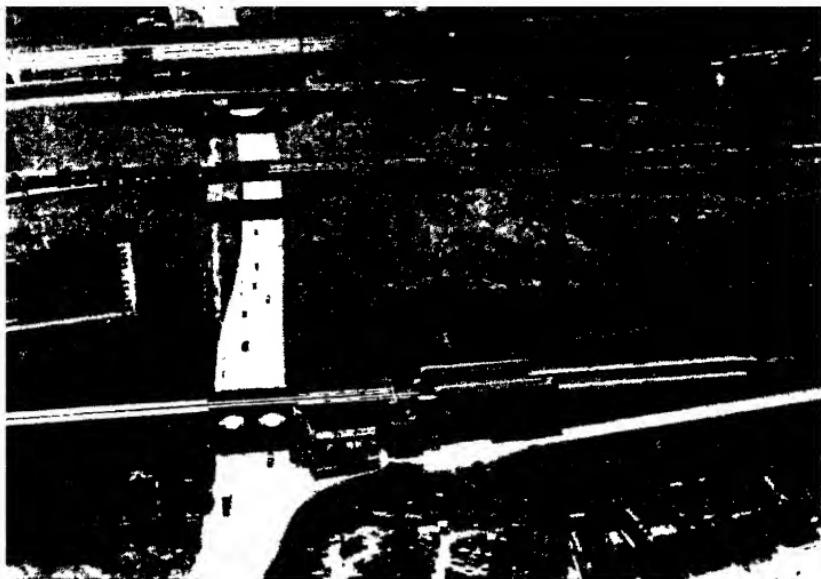


FIG. 33. Railway Routes between England and Scotland

Which of the routes has least difficulty from steep gradients? Find three rivers whose valleys have been of assistance in railway construction. In what different ways is the Pennine barrier crossed by railways?

The British Railway System.—Railways are built to carry goods from where they are found or manufactured to the places where they are needed. Where there is much movement of materials or people there will be many railways. Thus the coal-fields are all crossed by a regular network of tracks for coal transportation. The ten million people of London need much transport to carry the goods they need and manufacture and to carry themselves to



[Photo : Aero Pictorial, Ltd.]

FIG. 34. Road and Rail on the Outskirts of London

Here a modern motor road passes beneath railways running into London. Notice the main line in the background and the suburban line, with its station, in the foreground, the park for suburban passenger coaches on the left and the many-tracked sidings for storage and sorting of goods wagons.

and from their work and their play. Here, too, railways are numerous, and a great network, much of it underground in the central area, has been constructed.

Because London is the greatest centre of population and of business in the whole country, important lines of railway run to it from all parts. Two great lines, one east and one west of the Pennines, link it with Scotland. Two others go westward to the Welsh coast to link it with Ireland. Two more reach out westward and south-westward to bring goods and people from the Cornish peninsula and such ports as Bristol, Plymouth, and Southampton. A great loop reaches north by way of Cambridge

into Norfolk and returns across Suffolk and Essex to bring the farm products of those counties to London's markets. Half a dozen shorter lines help to link it with France and Belgium through ports on the coast of the English Channel. These routes form the skeleton of the railway system of Great Britain.

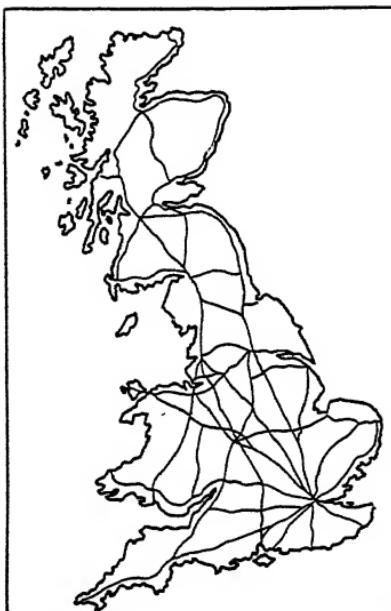


FIG. 35. Main Roads



FIG. 36. Main Railways

These main through-lines are connected by cross-routes wherever the population and trade makes their construction worth while. Thus an important route crosses them from north-east to south-west by way of York, Sheffield, Derby, and Birmingham to Bristol and Cardiff. The busy factory regions of the West Riding of Yorkshire and south Lancashire are linked by several lines that make use of the Pennine valleys where possible and then pass through

tunnels beneath the higher ground. The lower ground of the Scottish Lowlands carries a network of routes making passage from east to west easy.

¶ A very important task of the railway is to join our great ports to the manufacturing areas which need imported raw materials for their factories and in return provide manufactured goods for export. Thus many railway routes converge on places like Glasgow, Liverpool and Bristol.

In general, the road system of Britain has been developed on much the same lines as the railway system. A comparison of Fig. 35 and Fig. 36 will make this plain. At the same time it will show some differences. Because gradients are rather less important on roads than on railways, the former are more often found crossing mountainous areas. A good example of this is the famous Holyhead road which runs through the Welsh highlands in an almost direct line from Shrewsbury. The corresponding railway goes via Chester and the coastal lowland.

In Ireland both rail and road systems centre on Dublin and on Belfast, much as they do on London in the larger island. They are, of course, less numerous because the population is less and industrial centres fewer.

CHAPTER IX

TOWNS AND MARKETS

Neighbours.—In the highland areas of Britain few people make their homes. The moorland farms are far apart and the inhabitants must make long journeys to reach a shop or a post office. If anyone is ill it may be miles to the nearest doctor and bumpy travelling over poor roads to the local hospital. Even in the valleys the more clustered houses often form only tiny hamlets. The inhabitants of such districts must learn to do many things for themselves. The menfolk may be shepherds or farmers for a living, but they must be able to do simple masonry and carpentry to repair their homes, farm buildings, and implements. The women must be able to tend their sick folk, to make their own bread and the clothing they wear. In some remote districts, such as the western highlands of Scotland and Ireland, they must even be able to convert the raw wool from their sheep into yarn, to dye it and weave it into cloth or knit it into garments.

In the lowlands, on the other hand, are great towns where many thousands of people live in long streets of houses, with shop and post office close at hand and the doctor within a few minutes' walk. Here everyone has the advantage of near neighbours. If help is needed in any task it can be readily obtained. The shopkeeper does not have to close his shop for a day and go off to a distant railway station to bring coal or to climb on his roof to repair

the chimney or replace slates blown off in a gale. Instead, he sends a message to the coal merchant or the builder and gets on with his own work while they perform these tasks for him. Where there are so many people living together each can specialise in his own line, become an expert at one task, knowing that others will be available to do the jobs he cannot do for himself. It is this fact which makes town life easier and more attractive in some ways than country life. In the town there are even people, such as actors and cinema workers, who live by providing amusement for others, toymakers and makers of sports equipment who provide things for our playtime hours. In the town it is easy too to find information about things or people in whom one may be interested. Libraries and bookshops, museums and art galleries, colleges and universities can all be provided where there are enough interested people to make it worth while.

The Work Place.—Of course all the thousands of people in a town must be able to make a living there. Often what first brought them together was the possibility of finding profitable work. The building of a factory, mill, or steelworks offered jobs to many people. The erection of houses for the employees in such places formed the beginnings of the town. Shopkeepers opened up businesses to feed and clothe the workers. The doctor and the lawyer came to serve them. Schools were built for their children, banks and offices to handle their money and their business. As the town increased in size and the children grew up and looked for work, factory owners saw the chance of obtaining labour for the manufacture of their products, and so new and larger factories were built.

Even a small town needed a great variety of workers to keep it going. Strong unskilled workers were required for such tasks as cutting drains and sewers, laying gas and water pipes and electric cables, for portage at the railway station and for delivering goods to shops, factories, and homes. More skilled workers would be called for to run the gasworks, the power station, the tram, bus and railway systems, and the machinery in the factories. Still others would be needed for jobs like the care of the sick and the injured, which would call for even greater skill and knowledge. The town is now a work place, providing tasks for men and women of many trades and professions and of all degrees of intelligence and skill.

The training of people for all these tasks is most conveniently done in the town too. The schools make a start in fitting the young folk for the work they will have to do when they are grown up. In the technical and commercial schools and colleges young mechanics and clerks develop their skill and knowledge. If the town is large enough it will be able to maintain a university perhaps, and a hospital or hospitals, to train young men and women for the professions.

The Townspeople's Homes.—If all these busy people are not to waste much of their time and energy in travelling to and from their work every day they must live near the work place. The town therefore contains many dwellings in which the workers make their homes and rear their families. In the country, and especially in the thinly peopled parts, most jobs are connected in some way with farming. Both boys and girls begin work on the farm as they grow up. In the town there are many

kinds of work available and members of the same family often follow quite different occupations. People live so close together that it is generally quite easy to find friends who are interested in the same

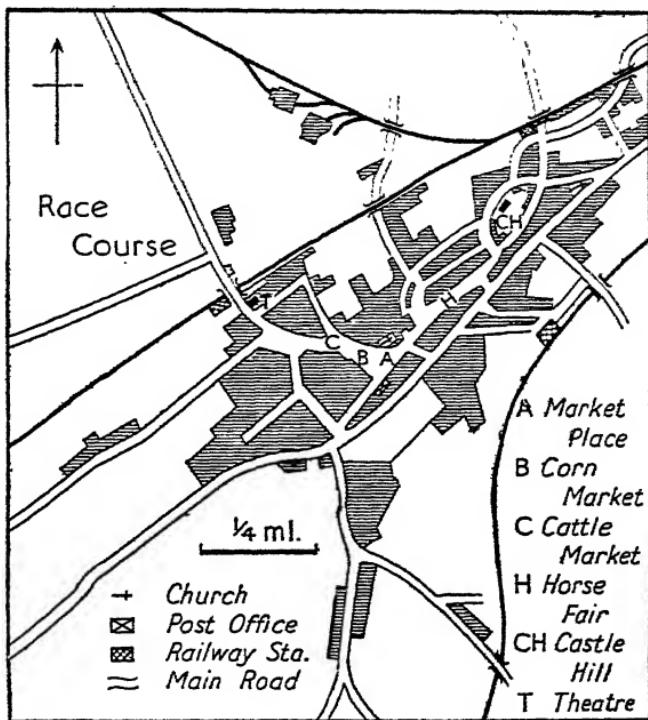


FIG. 37. Town Plan of Pontefract, W. Yorks.

The town is now mainly a shopping and entertainment centre for a coal-mining and industrial area. What evidence does the map give (a) that it formerly served a very different purpose, (b) that it has long been a place of some importance?

things. With so many people gathered together a great many kinds of entertainment become possible too. Theatres and cinemas, playing-fields and sports grounds are all worth providing, for their owners can be sure of crowds of people to make use of them.

The Town Market.—The heart of the town is often to be found in its markets. In some the townspeople purchase what they need—food and clothing, cooking vessels and furnishings. In the olden days most towns had a regular market-day when stalls were set up in an open space for the sale and purchase of many kinds of goods. Many towns still keep up the practice of having a market-day, though the roofed-in market hall has usually replaced the open market square. The market stalls have been largely replaced by shops open on every week-day.

In the olden days country people from the districts near the town brought in for sale the produce of their farms and gardens and took home what they needed of the produce of the town workers. Nowadays, however, much of the food we eat comes from foreign lands and the farmer asks for things the townspeople do not make. These the railway and the steamship, instead of the farmer's cart, bring into the town market. But it is still the buying and the selling place not only for the inhabitants of the town but for the district round. The town is the collecting centre and the distributing centre for the district in which it stands.

But it is not only the individual householders who need a market. The biggest transactions are not those which go on over the market stall or the shop counter. The factory owner must purchase his raw materials and sell his products and the shopkeeper buy in big lots what he sells to his customers in small quantities. This is done in the *exchanges*, such as the Liverpool and Manchester cotton exchanges, where the Lancashire mill owner buys the raw cotton or the partly manufactured cotton yarns he needs, or in the *wholesale markets*, such as Covent



[Photo : Farmer and Stockbreeder]

FIG. 38. A Country Cattle Market

The cattle in the pens can be examined by buyers before they are taken into the ring and auctioned. This market is on the edge of a Welsh border town. Nearly all of the cattle are for slaughter.

Garden in London, where greengrocers from miles around buy their supplies of fruit and vegetables.

The Transport Centre.—All this buying and selling, collecting and distributing, employs many people in a great variety of tasks. The transport workers—lorry drivers and railway men and dockworkers—see to the handling and shifting of the goods. Warehousemen see to their collection and storage until they can be distributed to the purchasers. Office workers see to the making out of bills for payment and orders for delivery, whilst the banks are kept

busy in making the payments and keeping account of them.

To the centre of the town come the roads from the surrounding country, great highways with lorries and motor-buses carrying goods and passengers, often following the same routes by which in olden days the mail-coach and the farm wagon reached the same destination. Into goods and passenger stations run the railway tracks that link the town with other cities near and far.

CHAPTER X

LONDON

London's Markets.—London is one of the world's greatest towns, the capital of the United Kingdom and of the Commonwealth. In and around it live eight million people. To its shops and markets are brought goods of every kind. To it come buyers seeking the products not only of our land but of every land. To supply its own people and those of the areas surrounding it, there have grown up great markets, each handling one kind of product; for ever since its foundation, away back at the very beginnings of English history, this has been its main work. Covent Garden is the market for fruit and vegetables. Meat, some of it fresh-killed carcases of English cattle and sheep, but much of it imported in a chilled or frozen condition from distant lands like Australia, New Zealand and Argentina, is sold in Smithfield. To Billingsgate are brought the catches of the North Sea fishermen. Lesser markets, such as the tea market and the fur market, handle imported goods. Wholesalers have their headquarters in special districts too, such as the dealers in jewellery and diamonds and those in tin and copper, or the firms that handle the garments and cloths of Yorkshire and Lancashire. Even the dealers in new and second-hand motor-cars seem to have gathered into one district. The export merchants who sell only to foreign buyers and the shipping firms who hire out their vessels to carry



[Photo : Fox Photos, Ltd.]

FIG. 39. Outside Billingsgate Fish Market, London

Fishing craft used to bring their catches to a little harbour here, but now nearly all the fish come in by rail. Most of the selling is "by sample," the purchaser collecting what he has bought from the lorries outside the market proper. Notice the large proportion of railway lorries.

cargoes to and from London have their own corners of the great city too. London can well be called the world market, but where the old country-town market had stalls each selling a single product, London has whole districts devoted to one product, and each district its hundreds of workers.

London's Port.—Modern London is built on both banks of the River Thames some thirty miles from where it enters the North Sea, and the river is navigable by quite large ships right up to the outskirts of the city. London has grown into a vast market largely because it was first a great port. There is much truth in the saying that the Thames made London's port and London's port made the city. The tide flows up the estuary and sweeps out again, making a difference of level of up to 20 feet between high tide and low tide and helping to keep the main channel clear by sweeping out to sea much of the mud and rubbish the river brings down. In olden days ships anchored in the river and goods and passengers went ashore in small boats, but now a great system of docks has been built so that they can unload direct on to stone quays, into trucks on the railways that run along these or into the warehouses that adjoin them. These latter often contain rooms that can be kept cold for the storage of meat and dairy produce or warmed for the ripening of bananas and other fruit imported in an unripe condition. The docks are supplied with cranes and other machinery for the quick and easy unloading of cargoes.

London as Transport Centre.—Three main factors determined the site of London. It was built in the midst of the very low land bordering the lower Thames; much of this was originally marsh land, flooded whenever the tide was high; in the

midst of these swampy areas rose a number of hillocks which stood up as patches of firmer and drier land. On two of these north of the river grew settlements which spread until they joined across the drained marshes. These became the City of

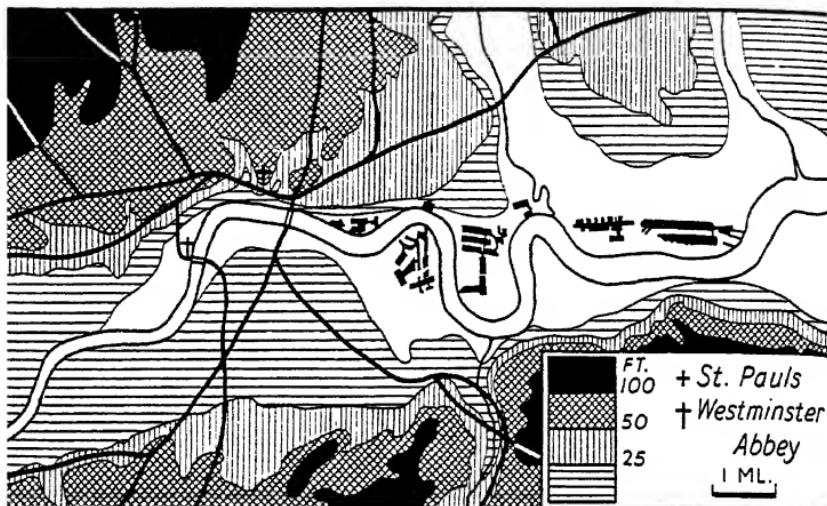


FIG. 40. The Site of London

The blank areas along the banks of the Thames would be marshy and liable to flooding at high tide if it were not for the embankments. Why are the docks in these areas? Why did the old roads keep away from them? What advantages for bridge construction had the crossing places shown?

London, gathered around St. Paul's Cathedral. Other settlements grew on the higher ground south of the river and in time were connected to the northern pair by bridges, of which old London Bridge was the first. Now there is a whole series of these bridges, carrying a great traffic of people and goods from one side to the other by railway or by road. Some miles away from the river to the north and to the south run two lines of chalk hills



[Photo : Aerofilms and Aero Pictorial Ltd.]

FIG. 41. London Bridges ; an Air-view looking Westward.

1. London Bridge—near the site of the earliest bridges.
2. The Pool—original anchorage of the port of London.
3. St. Katharine Dock—the farthest upstream of the docks ; notice the warehouses surrounding it.
4. The Tower.
5. St. Paul's.
6. Westminster Abbey and Houses of Parliament.
7. County Hall.
8. Waterloo Station—great terminus.
9. London Bridge Station.
10. Cannon St. Station—suburban terminus for city workers from south bank.

Both approach the river upstream near Reading and so enclose a triangular area of lowland known as the London Basin. The Thames flows through the lowest middle belt and London stands near its centre. Over these hills and through the gaps in the ranges run the roads and railways which bring the products of Britain to its greatest market. The drier hillocks, the bridges, and the convergence of roads and railways—these are the main things that have determined the site of London.

London's Industries.—As in lesser towns, the presence of great numbers of people living close together has given employment to other people in satisfying their needs. In some cases these employments have grown into important industries which supply districts far outside the London area. An obvious example is the group known as the food industries. Out of the bakers' shops and eating-houses have grown great factories making cakes and biscuits, meat-pastes and extracts, and drinks of many kinds. In the same way little tailors' shops have been partly replaced by clothing factories. Some of these began by using up odd lots of materials the wholesalers had left over from their purchases of Yorkshire- and Lancashire-made cloths. Some products call for the use of articles of many kinds, made in different parts of the country or even partly imported from abroad. London, with its central position, its port and road and railway connections, is excellently situated for the bringing together of these parts and their assembling and finishing. This kind of work is done in many factories in the London area. At first these were built mainly in the eastern and southern districts, but more recently there has grown up an *industrial belt*, with the most modern

factories and running through many of the outer suburbs. Many of these new industries provide work for women—the wives and daughters of men employed in heavier tasks. The making of radio equipment of all kinds is a good example of such new light industries, which have been developed considerably in recent years.

In olden days the presence of the Court and the people who lived in and about the royal palaces led to the establishment of businesses supplying costly dresses and jewellery in new styles. London thus became a fashion centre, and the wealthy people who make their homes in the capital city still employ many people on this kind of work. People in other parts of the country, and others living abroad even, soon begin to demand clothes of the same designs, for they too wish to be fashionably dressed. Many London dressmakers and milliners find work in supplying their requirements.

Eight million people in their idle hours or days take a lot of entertaining and it is often quite easy to supply the same kind of entertainment for people elsewhere. The entertainment industry of Britain has its headquarters in the London area. Plays prepared for London theatres and films made for London cinemas are sent out to other towns. Books and newspapers for instruction and for entertainment are printed and published here. Nearly all the monthly magazines, most of the well-known weekly journals and the great national daily newspapers are distributed from London offices. The West End is the main region for fashion production and the entertainment business. The jewellery business and newspaper and magazine publishing ("Fleet Street") still gather near St. Paul's Cathedral.

Industry and entertainment, business and amusement, work and play, bring many thousands of visitors to London from all over the world and this gives rise to another characteristic industry of the great city. Hotels and restaurants provide for these temporary residents and thereby give employment to many people, especially in the central areas.

London the Capital.—London became the capital of England many centuries ago. Its kings made their home at Westminster and there gathered around them their officers and counsellors and the great landowners of the kingdom. To-day it is not merely the capital of England but the capital of the Commonwealth. Out of the king's council Parliament has grown. The dwellings of his counsellors have been replaced by the offices of the great Government departments. Just as St. Paul's Cathedral has become the centre around which the London merchants carry on their business, so here in the twin city of Westminster, around the ancient Abbey and the Houses of Parliament, the business of government is centred. Foreign business men come to the City or to the West End; foreign statesmen to Westminster.

CHAPTER XI

SOUTHERN ENGLAND

The Sun and the Sea.—The southern parts of England are those which enjoy the hottest summers and the most abundant sunshine. From June to September the days are long and the skies often almost cloudless. They are pleasant months in the country districts, but in London the heat is often trying and many people seek to escape from it for a week or two or for an occasional week-end. Around the coasts the ~~heat~~ is tempered by cool breezes from the sea, and many smaller towns make a business out of providing for Londoners on holiday. Both the North Sea and the English Channel are near at hand, and fast trains and road coaches take the town-dweller to the sea in a very short time. Amongst the most popular of these seaside holiday resorts are Southend on the Essex coast, Margate near the eastern tip of Kent, and Brighton on the Sussex coast. Those who have sufficient time and can afford the longer railway journeys visit Bournemouth, in Hampshire, or one of the many smaller resorts amongst the bays and rocky headlands of Devon and Cornwall. The mild winter climate of these south-western districts makes them attractive to invalids and to older people who have retired from business as well as to the younger and more active holiday-makers.

Those who prefer country surroundings to the coast make for the more open districts where they can ramble freely. The chalk downs of Kent,

Surrey, and Sussex, the Devon and Cornish moors, and the sandy heaths of Surrey and Hampshire are favourite holiday grounds for such people.

The Continental Front.—The southern counties of England were by far the most important part of the country in its early history, mainly because they are so near to the continent of Europe. To their shores came the Romans and the Normans, and from them English armies have often crossed to France and Belgium. The bare chalk lands of Salisbury Plain and the sandy heaths around Aldershot have been the headquarters of the army for many years, for here they were conveniently placed to repel invaders or to proceed overseas themselves. Chatham, on the Thames estuary, and Portsmouth, on the Hampshire coast, became important naval stations ~~for~~ the same reasons. Ships stationed in these ports could watch the narrow seas that separate us from the Continent. In times of peace thousands of passengers and great quantities of goods pass to and fro over the same narrow seas every day. Many railways run from the interior lands on either side to ports on the Channel coasts. Where the sea journey is shortest these “packet stations” are closest and ships cross most frequently. Dover to Calais is the most popular and the shortest route. Others run from Folkestone to Boulogne and from Newhaven to Dieppe. Farther west regular lines of steamers ply from Weymouth to the Channel Isles and the Brittany coast, especially in the holiday season. Up the Channel come the great ocean liners from far-distant lands, making for the bigger ports such as Southampton and London, Havre, and Antwerp. The cross-Channel and up-and-down Channel traffic together make this the world’s busiest sea.

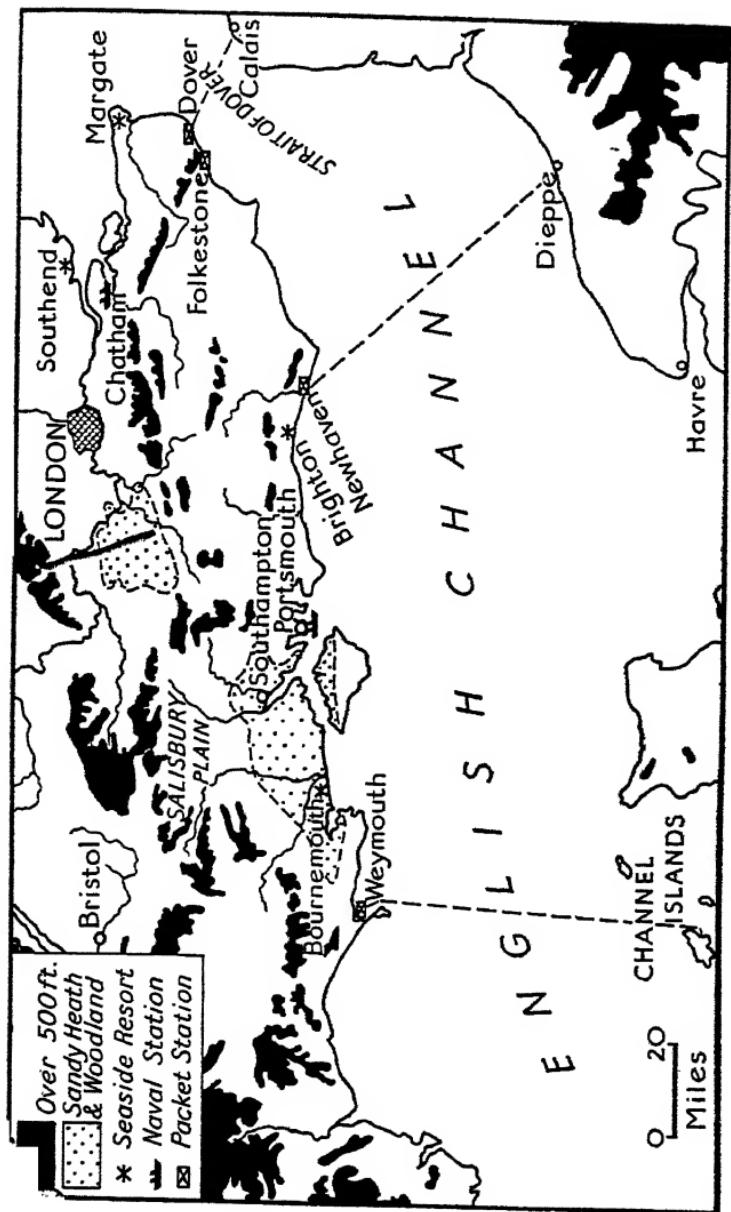
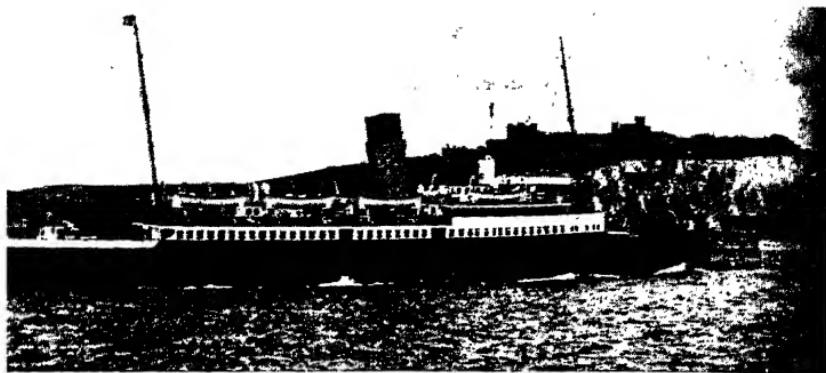


FIG. 42. S. E. England—The Continental Front

Why are the main military (Aldershot and Salisbury Plain) and naval (Portsmouth and Chatham) centres in this area?



[Courtesy Railway Executive, Southern Region]

FIG. 43. Cross-Channel Steamer Leaving Dover Harbour

How can you tell that this craft does not (i) carry heavy cargoes, (ii) make long voyages? Note the chalk cliffs and the castle.

South-Country Farming.—The south-country coasts alternate between wide open bays and high ~~head~~-lands. The great cliffs of Dover and Beachy Head occur where the chalk ridges of the North and South Downs come down to the sea. The great bays are backed by flatter and lower lands. In the south-west the higher and more extensive uplands of Devon and Cornwall explain the more frequent occurrence of long stretches of cliff. Only around the estuaries of the western rivers is there much low coastline.

This variety of hill and lowland and deep valley, of chalky and sandy and slatey rocks, gives rise to an equally great variety of soils. Some are heavy and clayey, wet and sticky in winter and apt to be dry and hard in summer, difficult to plough but often very fertile. Others are so loose and sandy and contain so little plant food that they are scarcely worth cultivating. Chalky soils are generally fertile, but often rather dry. The south-country farmer has to fit his crops to the soil of his farm. He can count

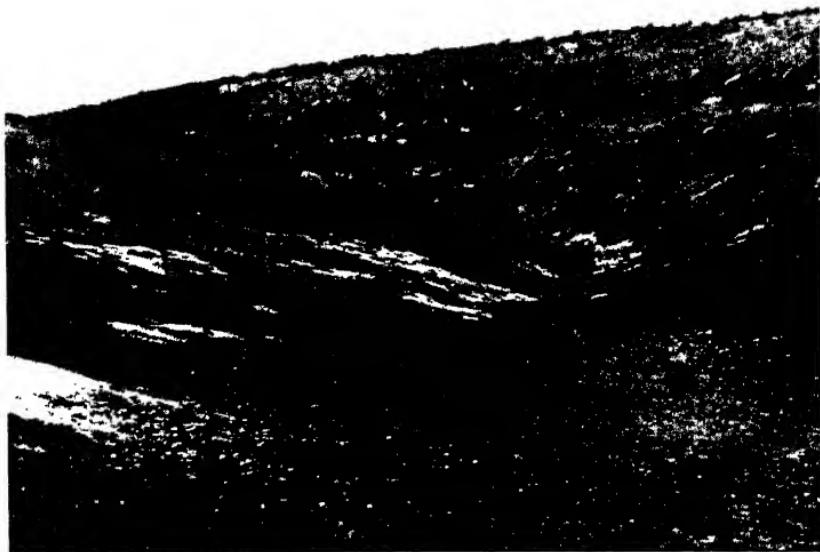


Photo : A. J. Bull

FIG. 44. A Valley in the South Downs

What is the underlying rock here? Why is there no stream in the valley? For what purposes could this land be used?

on more warmth in summer and more sunshine than he would get elsewhere in Britain. In the south-west he can be sure of sufficient rain, but in the south-east must expect some weeks of drought every few years.

In many parts of Kent chalk and clay and sand mingle to form very fertile soils which are easily worked. The hill-slopes where they face south escape the worst of the winter frosts and get most of the summer sun. These districts consequently grow more fruit than any other part of England, and orchards cover many acres of ground.

The dry chalk downs are generally bare of trees, but carry fine grass, too short for cattle to tear off

with their tongues but excellent for sheep, which can nibble it quite close. In winter they are often swept by cold, frosty winds, and this too makes them more suitable for sheep, protected by their thick woolly fleeces, than for cattle, which have no such covering. Sometimes the chalk and limestone hills have a thin coating of clayey soil and are not too steep to plough. Under these conditions crops are grown—wheat for the miller or root-crops for the winter-feeding of sheep.

In the wide clay vales, and especially on the land which is liable to flooding by their sluggish rivers, grasses grow luxuriantly, long and luscious, providing the kind of pasture that best suits cattle. The clayey lowlands of Hampshire and Dorset and the sheltered valleys of Somerset and Devon, where ~~the~~ mildness of the winter climate is a further help, are amongst our best dairy lands. They supply great quantities of fresh milk for London, as well as butter and cheese and cream.

In some districts farming gives place to market-gardening, and flowers and vegetables and soft fruits such as strawberries become the chief crops. The great population of London provides an immense market for such products, especially in their fresh state, and so all round the city, but especially on the lands near the Thames in Essex and north Kent, many people follow this occupation. Sometimes the kind of soil is especially suited to the growth of garden crops, as in parts of Hampshire, where the light, warm soil is just the right kind to suit strawberries. Where deep enough soils are to be found in the far south-west, in the southward-facing, sheltered, and sunny valleys of Cornwall and Devon, spring comes early and both flowers and



[Photo : "Times"]

FIG. 45. Gathering Daffodils for Market near Land's End, Cornwall

Why are the fields (i) in the valley ; (ii) so small ; (iii) surrounded by low but thick hedges ? Why is the headland so bare ?

vegetables are grown and sent early to market whilst prices are high.

South-Country Mining.—Farming is the main employment of most of the southern counties, but mining is not altogether absent. Most surprisingly, Kent, the "Garden of England," has also its coal-mines. Deep below ground in the eastern part of the county thick seams of good coal occur and are now worked in one of our most modern coalfields. Though it does not compare either in area or output with the better-known northern and Midland coal-fields, its position close to London and to the port of Dover give it considerable importance.

Quarrying of chalk for the fields, for lime burning,

and for cement, and of other rocks, such as the famous Portland stone and the granite of Dartmoor for building purposes, is carried on in many districts. Southern Cornwall has a mining industry of its own, the extraction of china-clay. This substance has been formed by the decay of the local granite rocks. It is washed free from impurities and then shipped from the little local harbours to the Mersey, whence it is carried by canal to the Staffordshire potteries. St. Austell is the centre of this industry.

Towns and Transport.—In the days before coal-mining and the steam engine had made England a land of manufacturing industries the rich farming districts of the south were the most thickly peopled parts of the country. The market towns such as Salisbury and Exeter, Winchester and Canterbury, were the wealthiest in the land, as their great ancient



FIG. 46. Site of Reading

Note (i) the junction of the Thames and Kennet and their valleys opening routes westward across the Chalk Ridge ; (ii) the strip without building along the Thames between Reading and Caversham ; (iii) the wider area under 200 feet available on the south bank allowing for the greater growth of Reading.

churches show. Many have scarcely grown at all, but some have kept pace with the increase of population elsewhere and some quite modern towns have arisen. The presence or absence of railways has had much to do with this difference. Where a town was on the route of one of the main lines, and especially if it were at the junction of several routes, its market grew, for it could easily send its produce

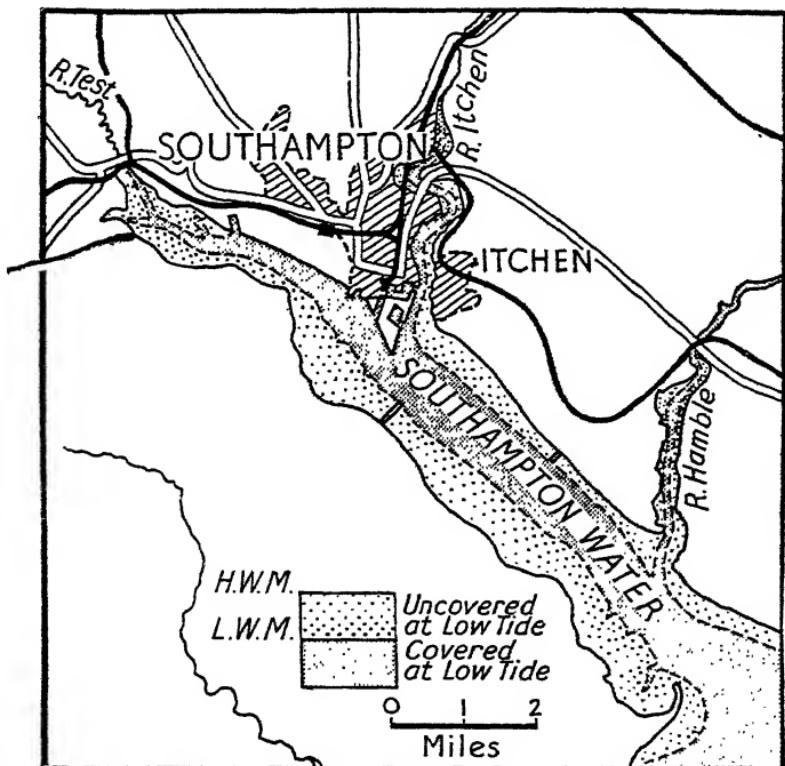


FIG. 47. The Site of Southampton

Note (i) how the deep-water channel reaches right up to the head of the estuary ; (ii) the long water front for landing places formed between the Test and Itchen.

far afield. Some even established industries of their own. Reading is a good example of this class.

Of the coastal towns those which were suited for cross-Channel traffic, like Dover, kept on growing, as did also those to which direct railway service to and from London could be constructed. Plymouth has kept its old position, partly by reason of its use as a naval harbour and partly because its railway service was good enough to make it worth while for some passenger and mail liners to call there. Southampton, on the other hand, is a modern port. Closer to London and with tidal marshes suitable for dock construction, the Southern Railway made it the most important passenger port in Britain. Its long estuary gives shelter and its deep channel enables the biggest craft afloat to reach its docks.

CHAPTER XII

WALES AND ITS BORDERLANDS

Mountain, River, and Sea.—Wales is the most completely mountainous of all the British lands. Its eastern boundary follows the edge of the uplands and there is no considerable stretch of lowland within its borders. Even its coastal strips are narrow, except in the south and in the island of Anglesey. It is on these narrow belts bordering the seas and in the long, deep valleys that penetrate the hill country that most people live.

The highest and most mountainous parts of the country, those over 2000 feet above sea-level, occur in the north-western areas. Wide moorlands cover the rest of the uplands, their smooth, rounded outlines and cover of vegetation distinguishing them from the rocky and bare mountain districts. The longest and most fertile valleys are those which open towards England, the upper valleys of the Dee and of the Severn and its tributaries. Innumerable lesser streams drain from the hilly country to the Bristol Channel, Cardigan Bay, and the Irish Sea.

In many places the highlands reach almost to the sea and drop steeply towards it. This is especially so on the west coast. On the north there is in places a narrow lowland strip between the hills and the sea, while on the south the wider lowlands are continued into the hills by several wide valleys. Off the western peninsulas a number of small islands occur, a few of them inhabited. The people of the coast-lands have

long combined fishing with farming. To-day a few trawlers go out from Swansea for deep-sea fishing and the salmon fisheries of the estuaries are still of some importance. The sandy beaches and fine

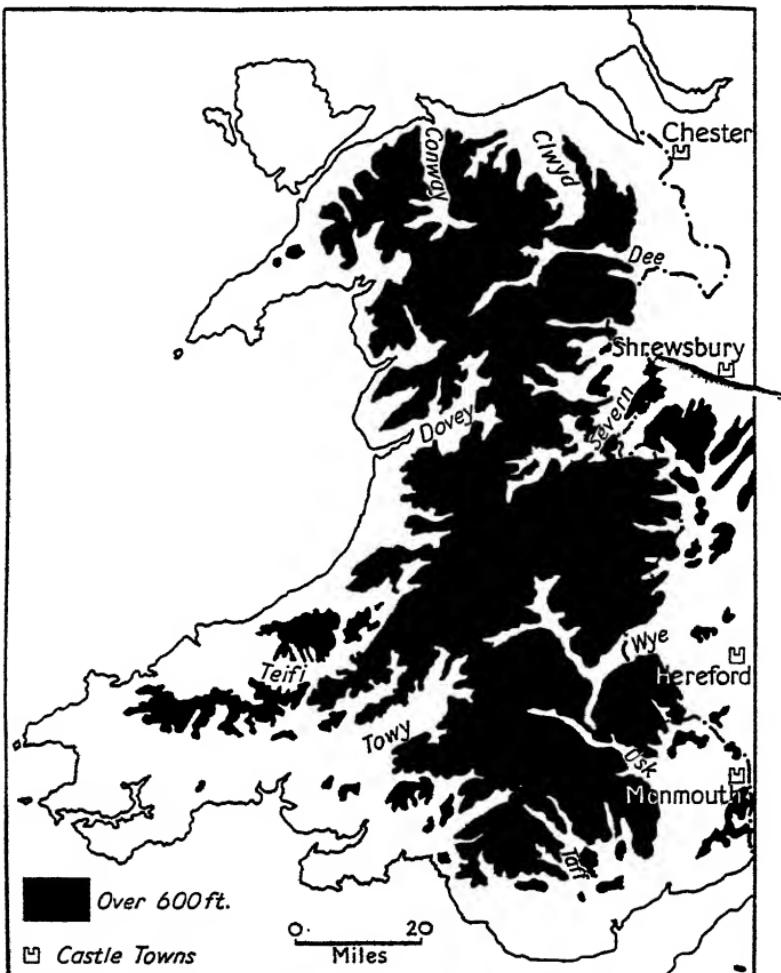


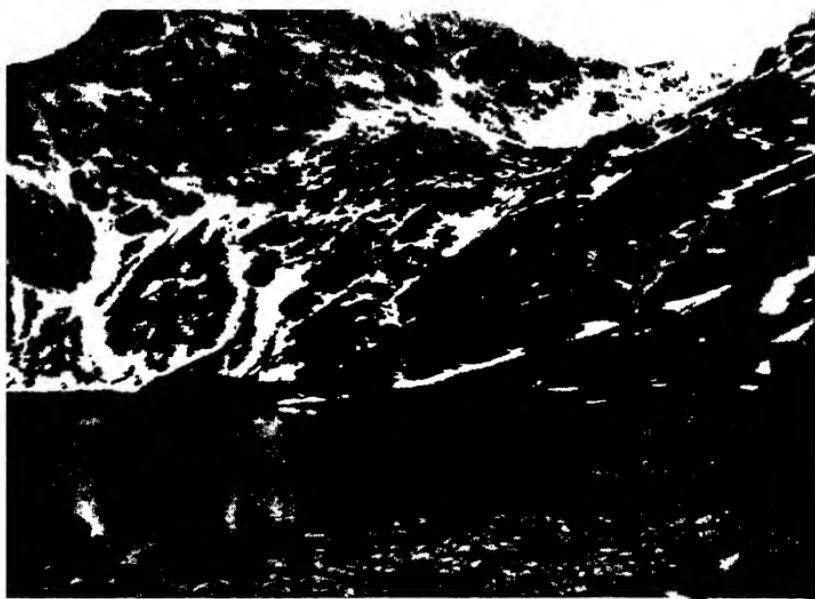
FIG. 48. Wales—Relief

Note (i) how the highlands have been cut up by river valleys ; (ii) how the old castle towns are related to the lowland routes into Wales.

scenery attract many summer visitors from the industrial Midlands and south Lancashire, for few parts of Britain can offer such varied attractions. Along the north coast especially holiday resorts have grown, of which Llandudno is the chief. The railway route passing along the coast on its way to Holyhead for the crossing to Ireland has helped enormously in their development.

Wild Wales.—The name “Wild Wales” has often been applied to this small western country. This is not only because of its open and almost uninhabited moorlands, for its weather in many parts is also often wild. Its westerly situation and its bordering seas keep it mild in winter and cool in summer, but they also make it open to wild gales from the Atlantic. Especially in the south and south-west, these sweep in over the coast-lands and far up the valleys and bring much rain to all the high country. The mountain areas often have over 100 inches a year and the uplands generally have over 50 inches. Even the coastal lowlands have about 35 inches, about one and a half times as much as south-eastern England. Fortunately most of this falls in the late autumn and winter months, and the rain in the holiday and harvest months comes mainly in short, heavy showers.

The damp, exposed moorland country is of little use for farming and is therefore thinly inhabited. The many narrow deep valleys are occupied by clear-running streams kept full by the frequent and heavy rains, for the rocks here, unlike the chalky and sandy beds of much of southern England, are not absorbent. For this reason most of the rain flows quickly down the slopes to the rivers. The damming of the valleys is generally not difficult, and



[Photo: Valentine, London]

FIG. 49. Snowdon, North Wales

The lake is nearly 2000 feet above sea-level, the peak 1500 feet higher. Few mountains in Britain are either so rocky or so pyramidal in shape.

consequently many reservoirs have been constructed. Great towns as far distant as Birmingham and Liverpool draw their drinking water from this region.

The damp climate of the upland areas makes the growing of crops impossible, and the farming is therefore pastoral in character. Nearly one-eighth of all the land in Wales is useless for agriculture and about one-third provides only rough grazing. The higher mountain areas support only sheep and even on the lower moorlands cattle are few. During the winter the sheep are driven down to the lowland farms, partly because here they avoid the severity of the moorland winter and partly because the lowland farmer can grow roots and other crops for winter food. In the valleys and on the coastal



[Courtesy Railway Executive, Western Region]

FIG. 50. Unloading Milk Cans at a Country Station, South Wales

The milk is collected from the farms by lorry and sent on by rail. What districts are likely to be served from this station?

districts cattle are more numerous and mixed farming used to be the rule. Speedier transport by railway and motor-lorry has encouraged the rearing of cattle for milk. This is especially important in the Towy valley in Carmarthenshire, which sends milk not only to the industrial towns of South Wales but even to London.

A rather unusual industry is carried on almost entirely in the high north-western regions, and especially between Snowdon and the Menai Straits. This is the quarrying of slates, particularly for roofing purposes. The slate rock is split off from the quarry face in great masses, which are afterwards sawn into regular blocks and then split to the thickness required.

The local sheep-flocks provided the raw material for an old-established woollen industry. At first this was carried on in the home, but later it came to be concentrated in small factories in specially favoured areas. Large supplies of soft water were needed for washing the fleeces and for dyeing the yarn, and since the water of the streams could also be used to drive the machinery, these factories were built on the banks of swiftly flowing rivers. To-day most of them are found in the Teifi and Towy valleys, but they use foreign wool rather than Welsh.

The Severn Valley.—The River Severn rises in the very heart of the Welsh hills and sweeps in a great curve to reach the sea below Gloucester. Its tributaries, the Teme, Wye, and Usk, follow ~~similar~~ courses. The Dee follows another great eastward-opening valley, but turns northward instead of southward to reach the Irish Sea. The easiest routes from the English Midlands into and across Wales follow these rivers. Long before the days of metalled roads or of railways, the cattle and sheep of the Welsh farms were driven along them to the English markets and pack-horses brought loads of wool to the lowland towns. In the days of the Norman settlement the hill tribes were shut in by the building of great castles at suitable points along the border, just as the Romans had sought to confine them by the construction of armed camps. Around these ancient castles and camps have grown such modern towns as Chester, Shrewsbury, Worcester, and Hereford, and through them pass to-day the railroads and motor roads carrying products and holiday-makers between the same two regions.

Since these valleys face away from the prevailing

winds and are in part shielded from them by the high Welsh mountains, they have much less rain than the western valleys. Their wider and more gently sloping floors also make them more suitable for agriculture. They offer much better feeding for animals and the possibility of growing fodder crops for them too. An important part of the farmer's work here is concerned with the fattening of Welsh sheep and cattle ready for slaughter. The river meadows provide grazing for dairy herds too.

Southward-facing slopes in all this border region benefit from direct sunshine and the winter mildness brought by the south-westerly winds. Many acres of such lands in Worcestershire and Herefordshire are therefore covered with orchards producing plums, apples, and pears in great quantities. The Teme valley and some of its lesser neighbours also grow hops for the Midland breweries. The better favoured lowland country, especially in the Warwickshire Avon valley just before that stream reaches the Severn, is good market-gardening land. Birmingham and the industrial towns around it provide a great market close at hand.

The lower Severn valley opens on the Bristol Channel and thus faces the Atlantic and provides a natural highway from that ocean to the very heart of England. The ancient port of Bristol owes much of its importance to this.

Industrial Wales.—Far the greater part of the population of Wales is gathered in its two main industrial areas. Its crowding there is bound up with the story of the British iron and steel industry. Originally iron was extracted from its ores by heating these in a charcoal-burning furnace. By the early eighteenth

century the suitable English woodlands were becoming exhausted and the industry was spreading into the wooded Welsh valleys. During that century coke, obtained by partially burning coal, began to be used as fuel and the industry began to shift to the coalfields. The South Wales coalfield had many advantages for carrying on this new industry, and it grew rapidly on the north-eastern edge near Pontypool. About a century later steel began to replace iron and purer foreign ores were used instead of those obtained from the coalfield. As a consequence of this, steelworks were established near the coast and especially in the south-western area of the coalfield, near Swansea. Similar developments occurred on the smaller North Wales coalfield.

Even before the coming of the steelworks the Swansea region was smelting other metals, such as copper and lead. When processes for the rolling of thin steel plates had been worked out in this area, another development took place. This was the introduction of tin-plating. The thin steel plates when coated with a very thin layer of tin were protected against rusting and could therefore be used for a variety of purposes, especially in the packing of foods. The import of tin from foreign lands increased, the industry spread to several towns in the Swansea district, and thus it became the main producing area for the whole world. Many lesser industries have grown in the same region, such as galvanising—the covering of steel goods with zinc—and many branches of the chemical industry. The North Wales coalfield has also developed many such industries, but paper and rayon (artificial silk) making are more characteristic.



[Photo : Edith Tudor Hart.]

FIG. 51. Porth, Rhondda, South Wales

Compare the valley here with that in Fig. 32. Note the position of the mines in the valley bottom and the rows of miners' cottages on the slopes.

As soon as coke began to be used in the iron industry the demand for coal increased rapidly, and many mines were opened where suitable coal could be found. But it was after steel-making had moved to the ports that the most rapid growth in mining began. The coal of the middle and western sections of the coalfield was useless for coke-making, but was excellent for steam boilers, whether in ships, in locomotives, or in factories. At first it was used in the ore-carrying ships. Then it was carried overseas to depots or coaling stations all over the world where steamships could refill their bunkers. Countries like Italy and the South American lands were keen to have it for their railways. Deeper pits employing many more men were sunk. The great days of the coal trade had come. Villages grew into towns and Glamorgan came to have more than half the population of Wales. Cardiff and Newport became primarily coal-exporting ports—in little over a

century Cardiff grew from a village with 2000 people into the biggest of Welsh cities with nearly 250,000. The western ports such as Swansea grew in the same way. New industries, like flour-milling in Cardiff,

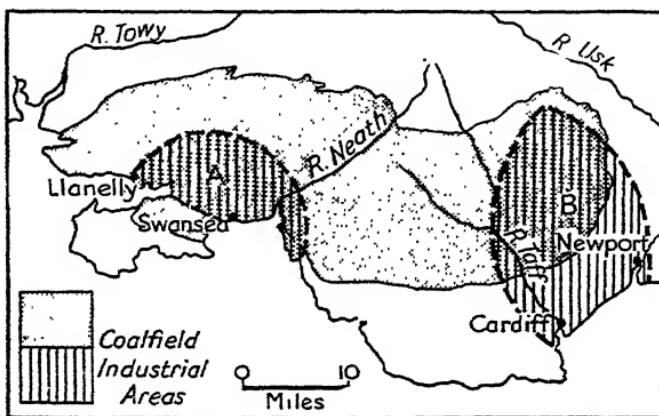


FIG. 52. The South Wales Coalfield

Industrial development has been greatest on those parts of the coalfield near the ports. Why?

grew up to use the raw materials the coal-carrying ships brought home.

Railways.—The development of the coal-mining areas led to a great building of railways. The mines provided the fuel in the first place. In the second, the railways were necessary to haul the coal, the ores, the timber for the mines, and the food for the miners between the ports and the mining centres. Cardiff, Newport, and Swansea all have numerous railroads running inland over the coalfield.

Wales lies between England and Ireland and stretches out two long peninsulas towards the latter country offering relatively short and therefore speedy crossings. Two main through railway routes

have been constructed to deal with the traffic. One passes from Chester along the northern coastal plain, across Anglesey to the harbour of Holyhead, whence fast steamers run to Kingstown (which the Irish call Dun Laoghaire), close to Dublin. The southern route tunnels under the lower Severn and passes by way of Cardiff and Swansea to the little harbour of Fishguard, where steamers link it to Rosslare in south-eastern Ireland. The great valleys of mid-Wales carry less important routes, such as that from Shrewsbury to the west-coast resort of Aberystwyth.

CHAPTER XIII

THE MIDLANDS AND THE TRENT BASIN

The Heart of England.—In the very centre of England there lies a shield-shaped region of moderately high ground reaching up to about 700 feet above sea-level. This area is sometimes called the Midland plateau. Its south-western edge drops steeply to the valley of the Severn its south-eastern rather less steeply to the Avon. These two edges form the high rim of the shield and are crossed only with difficulty by two or three railway routes. Within these limits the land is somewhat hollowed and slopes towards the low northern edge. Here neither railway nor road has any difficulty in reaching the plateau centre at Birmingham, though the main railway route from London to the north-west keeps clear of it. A tributary of the Trent drains the great hollow northwards.

Around the northern side of the plateau sweeps a great curving plain from the Irish Sea to the North Sea. Its western section is the Cheshire Plain, its north-eastern section the Plain of York, and linking these lies the wide valley of the River Trent. These plains and the lower parts of the plateau are covered with reddish soils often sandy in character, hence another name for the region is the New Red Sandstone Plain. The higher ground is formed of masses of old rock standing up through the red sandstones like islands in a red sea.

This belt of lowland is of great importance to the

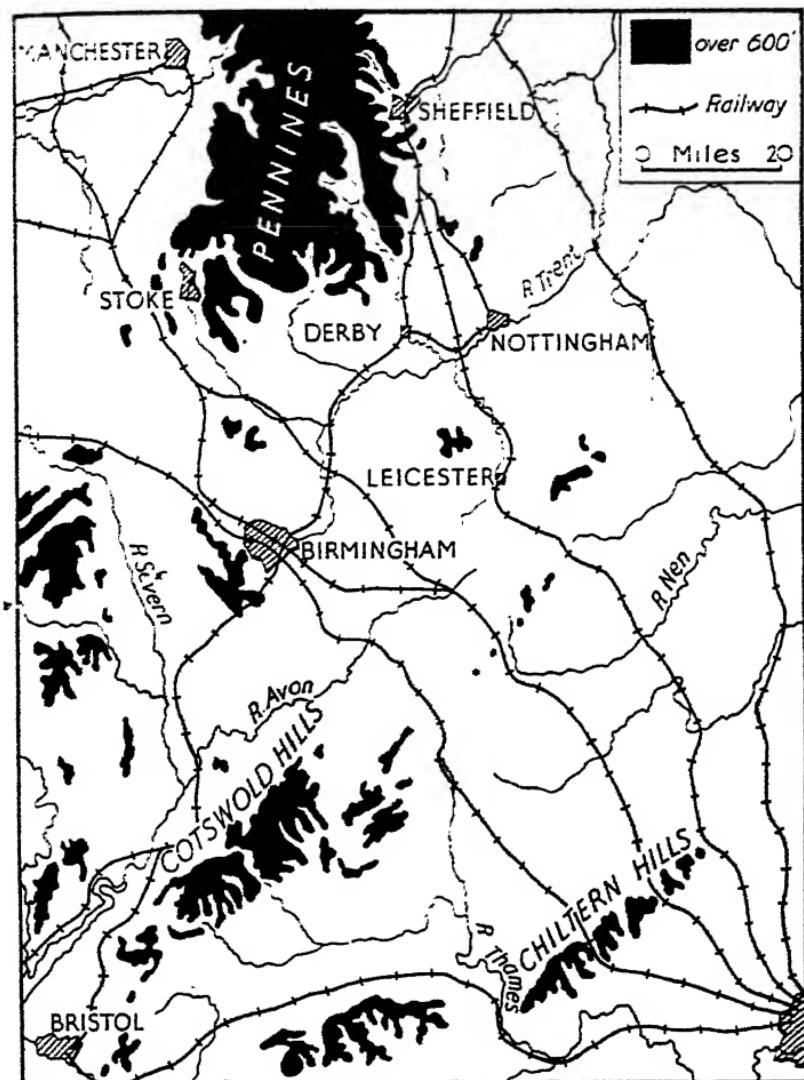


FIG. 53. The Heart of England

Pick out the lines of the Chalk and the Jurassic escarpments and note the railways crossing them from the Midlands to London. The rivers show the three main lowland routes from Birmingham to the sea—(a) the Lower Severn to Bristol and Cardiff; (b) the Trent to the Humber ports; (c) the Midland Gate (R. Weaver) to the Mersey ports.

Midlands, for it makes communication to the sea easy, not only by road and rail but by canal and river too. Hull and Liverpool, the ports at either end of it, deal with most of the overseas trade of the Birmingham area. The steep drop to the Severn and its narrower lowland make communication with Bristol and Cardiff less easy.

The River Trent.—The River Trent flows in a great arc from the borders of Cheshire to the Humber estuary, and receives tributaries from each side of its course. The two groups differ much in their character. The southern ones flow gently in wide, shallow valleys. The northern come down from the Peak District, the high southern end of the Pennine upland. They have cut deep, narrow valleys in the grey limestones that underlie the Derbyshire moors. Many are broken by waterfalls and all run swiftly. They offer some of the finest scenery in Britain and are visited every year by many thousands of people looking for peaceful tramping or fishing holidays. The main stream of the Trent rises on the western slopes of the Peak and emerges from this first stage of its course as a strongly flowing river. Once clear of the hills it enters on the second stage, winding more slowly in great, swinging curves through the lowland, and constantly growing in width as it receives the waters of its tributaries. In this section it passes the towns of Stafford and Burton, leaves Derby a little to the north, and sweeps through Nottingham. Just after leaving the latter city it turns northward and enters on the last part of its course. Here there is often no recognisable valley and a slight rise in its level is enough to cause it to flood a wide stretch of country on either bank. This is its flood plain. There are no cities



[Photo : Crown Copyright reserved]

FIG. 54. Coseley, Staffordshire

This village is on the western edge of the Black Country. Coal was found very near the surface here and was worked out long ago—the banks of waste from the mines still remain. The arterial road and the railway link Birmingham and Wolverhampton.

bordering its banks, bridges are very few, and even the villages are built well away from it. Most great rivers show the same three stages to some degree, but few English rivers show all three so well as the Trent.

West Midland Industries.—Scattered around the Pennine and Midland uplands are a number of coal-fields, none very extensive in area, but each the centre of a busy industrial area. Near the borders of Cheshire and Staffordshire when the Trent leaves the Pennine uplands, it crosses the North Staffordshire coalfield. Here a group of towns, now united

in the one great city of Stoke, form the home of the English pottery industry, world-famed for the beauty and quality of its china and earthenware. Fireclay and coal for the furnaces are on the spot, salt for glazing the cruder earthenware is obtainable from the Cheshire salt-mines close at hand, and raw materials from other regions at home and overseas are brought by rail and by canal barge from the Mersey ports. Stafford uses hides from the cattle of the Cheshire Plain and the Trent valley, with others imported from abroad, for its boot manufacture. The need of coal for fuel and power being less, it has grown up south of the coalfield and between it and the larger and more important South Staffordshire mining area.

The South Staffordshire coalfield is first amongst the Midland fields by reason of its large output and the great part it has played in English industrial development. On its southern half stand a cluster of some fifteen towns with populations ranging from about 30,000 to Birmingham's million inhabitants. In this area most of the coal has now been worked, but newer mines to the north and on the western edge still supply enough to support their industries. Here the first experiments in the use of coal for iron-smelting were carried out, and the successful use of coke was first established on the Shropshire coalfield only a few miles away to the west. When the local ore was exhausted smelting was gradually abandoned, but iron was brought in from elsewhere to supply the many industries already established. Almost every kind of product made from iron and steel is found here, even anchors and chains for ships, though it is a hundred miles from the sea. Other metals than steel are used too, including brass

and copper, gold and silver. Perhaps two types of metal ware are outstanding. The first is often spoken of under the general term of *hardware*: light metal articles used in the home, such as buckets and baths, saucepans and shovels, and others used by



FIG. 55. The Industrial Midlands

The heavier industries (engineering, etc.) are more characteristic of the western midlands, the lighter industries (shoes, hosiery, etc.) of the eastern.

the building and similar trades, such as bolts and locks, hinges and screws, door handles and bath taps. The second type consists of articles requiring more skilful work, such as machinery and machine parts, motor-car engines and gear-boxes, steam locomotives and electrical apparatus. A great many other subsidiary industries have also been developed to supply the needs of the major ones. Thus the ~~motor~~ and cycle trades of Birmingham are supplied with tyres from the rubber factories of Birmingham and Wolverhampton. Food industries, such as pig



[Courtesy of Cadbury Bros., Ltd.]

FIG. 56. A Modern Factory in a Birmingham Suburb

Modern light industries, largely using electric power, make possible such light and clean factory buildings as these. These conditions are especially important in the food industries.

products and cocoa, help in the feeding of the two million people in the area.

The Warwickshire coalfield has a much smaller output of coal and supports a smaller industrial population. Coventry is now mainly engaged in the motor trade, and its old silk industry is only represented by the silk hosiery trade of Nuneaton.

The East Midlands.—In the industrial region of the West Midlands towns are so closely crowded together that there is little room for agriculture, but in the East Midlands the industrial towns are more widely scattered and stand like islands in an area which is mainly farmland. Burton, Derby, Nottingham, and Leicester are not on coalfields, and their manufactures are not of a kind that calls for great quantities of fuel. Such coal as they need can be readily obtained from the neighbouring South Yorkshire field. Of these cities only Derby is much concerned with the metal trades. Its engineering

industry draws on coal from farther north, limestone from the Peak and iron-ore from Northamptonshire. It is really an off-shoot from the Sheffield region. Nottingham and Leicester and a few smaller towns in the area are largely concerned with the knitwear industries, producing lace curtains, hosiery, and underwear. The artificial silk industry of Derby supplies part of their raw material. Leicester shares with Northampton to the south and Stafford to the west in the production of boots and shoes.

Midland Agriculture.—The soils of all this Midland area are fairly fertile and the damp lowlands along the rivers produce excellent cattle pastures. In parts of Leicestershire these are good enough to fatten beasts for slaughter without the aid of grain crops or imported foodstuffs. The workers in the metal industries are great consumers of meat, so the farmer producing pigs and fat cattle has a good market close at hand. Similarly the town-dwellers will take all the milk the dairy farmer of the Vale of Trent can provide, while the boot industries use far more hides than local cattle-rearers have for disposal. Barley for the Burton breweries, roots to supplement the winter pastures, and potatoes for the town population are the main products of the arable farmer.

Midland Communications.—If the London area is the main focus or meeting-place of English roads and railways, the Midlands can claim to be the great cross-roads of England. Here the great routes from London to the north and north-west are crossed by the scarcely less important routes from north-east to south-west. Routes to Ireland and to Lancashire and Scotland enter the area by way of Rugby and cross to the north of the plateau to

Stafford and Crewe, with a great loop to link up Birmingham with the main lines. The Great Western route from London to Liverpool and Shrewsbury crosses by way of Leamington, Birmingham, and Wolverhampton. Another route to Scotland passes across the East Midlands by way of Leicester and Nottingham and on to West Yorkshire, whilst yet another skirts them as it passes through Grantham and Doncaster. The Great North Road runs near this last railway route and the equally famous Holyhead Road keeps near the railway route to Ireland, in its Midland section at least. Cutting diagonally across these are the routes coming from north-east England, from Hull and the West Riding of Yorkshire, to pass via Derby and Birmingham to Bristol and South Wales.

The lowland belts offer opportunities for the linking together of the river systems by means of canals. Though these are not of much importance to-day, they formerly carried a good deal of traffic and may do so again. Birmingham still receives much of its coal by canal barge, and the steepness of the south-western rim of the plateau has not prevented its linking with Gloucester and the lower Severn. Other routes link the Severn and Mersey, the Mersey and Trent, and Trent and Thames.

CHAPTER XIV

THE EASTERN COUNTIES

The English Lowlands.—The counties of Lincoln, Cambridge, Bedford, Norfolk, and Suffolk contain more low-lying land than any other region of England and Wales of similar size. It is true that they are crossed by the chalk escarpment, but this is here generally a broad ridge, open to cultivation over almost its whole surface and seldom reaching more than three or four hundred feet above sea-level. There is little that can be properly termed *downland*, except in the south-west corner of Bedfordshire. The Jurassic escarpment separates these eastern lowlands from the basins of the Trent and the Warwickshire Avon. Between the two ridges lies the great clay vale, stretching from Oxfordshire to the Wash, whilst east of the chalk the East Anglian lowland sinks gently to the muddy or sandy shores of the North Sea. This last area is the largest area which can be called a plain to be found anywhere in Britain.

The rivers of all this region are slow-flowing, winding streams, very apt to overflow their banks and flood the neighbouring land in times of continued rain or when a thaw succeeds a heavy snow-fall. Before man interfered to check this flooding by building up the river banks, there were many reed-fringed pools and marshy stretches. Shallow lakes of this kind are still present in the eastern parts of Norfolk, where they are known as the

Broads. The marshy areas were most extensive around the head and the western side of the Wash.

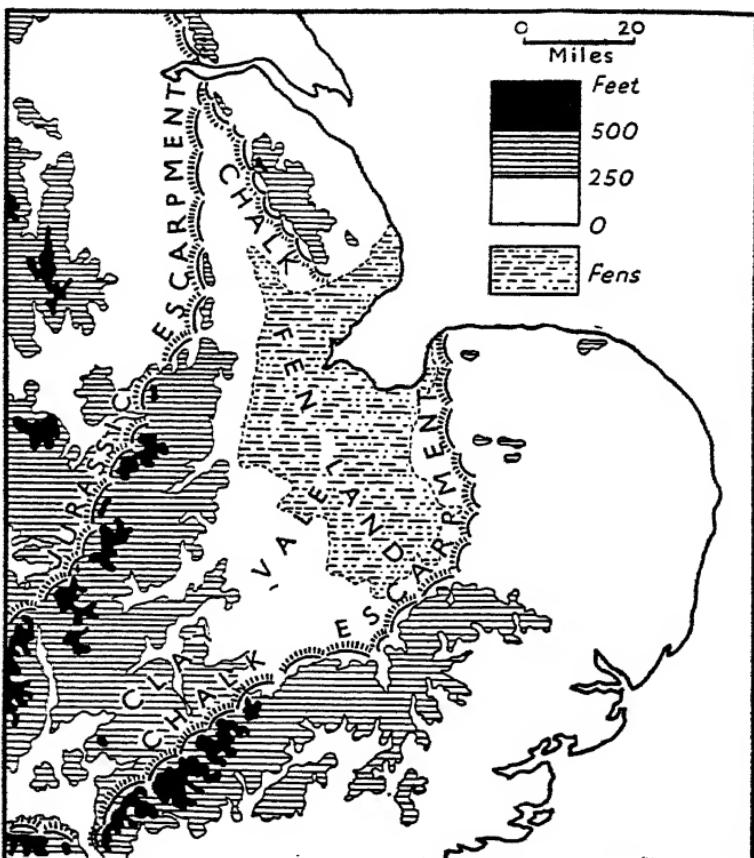


FIG. 57. The Eastern Counties

Note the two escarpments and the three lowlands (Trent Plain, Clay Vale and coastal plain) they separate.

These have been for the most part embanked against flooding and drained by means of artificial channels and pumps, but a few patches of the Fens still retain their original character.

Farming.—Mining is practically absent from the whole of this region and even quarrying is rare, except where clay is extracted for brick-making. On the other hand, it includes much of the best farm-land in Britain. A higher proportion of its surface is devoted to crops and less to pasture than in any other district. In the days before England became an industrial land these were her wealthiest and most densely peopled counties, for they provided her supplies of bread corn and much of her meat.

The low clay lands were often too wet and too difficult to plough, but they carried rich crops of grass for summer pasture and much hay for winter feeding. There were, therefore, and still are, many cattle kept both for meat and for milk. When the low Fenlands were drained their soils were often found to be very fertile and were added to the carefully cultivated lighter soil areas. To-day these grow great quantities of market-garden produce, especially in South Lincolnshire and Cambridgeshire, which go to feed the townsfolk in the London area and the industrial towns of the Midlands. Heavy crops of peas and beans, cabbages and carrots, beetroots and broccoli are carried away by train and motor-lorry. Where the soils were peaty they were soon found to be specially suitable for potato-growing. Another area in Bedfordshire is famous for its heavy crops of vegetables. More recently some favoured districts have been devoted to fruit growing, for there is more sunshine here than in most parts of the country. This helps to ripen strawberries and other small fruits for the jam factories of Wisbech and Cambridge, as well as for the town markets.

Mixed Farming.—In Norfolk and parts of Suffolk mixed farming reaches its highest standards, and



Photo : Eric Guy

FIG. 58. Sheep Folded on Kale and Roots

These are young sheep being fattened for slaughter in their first winter. The crops were grown for this purpose but will be supplemented by dry grain foods. Note that harvesting of such a crop is unnecessary and the sheep leave the land trodden, manured and cleaned ready for ploughing for the next crop in the rotation.

few areas anywhere in the world can rival the productivity of these lands and the skill of their farmers. The greater part of the land is constantly bearing crops, its fertility being maintained by deep ploughing, heavy manuring, and careful rotation. It was here that the famous four-year or Norfolk rotation—clover or grass, wheat, root-crops, oats or barley—was worked out. On some of the best farms the crop for a particular field is planned nine years ahead. The principal things grown are wheat and barley, sugar-beet, turnips, oats, and hay. The first three are almost entirely sold for consumption off the farm, but the others, besides special forage crops grown for the purpose, are fed to sheep and cattle. Lambs and calves are bought from the breeders in other parts of the country, particularly in the late summer and early autumn, and fattened for sale.

to the butcher during the winter and spring months. The sheep are *folded* on the turnip fields, that is, enclosed by light fences on first one section and then another, until the crop has been eaten up. This system saves the farmer the labour of harvesting the crop and also secures an even manuring of the field. The cattle are kept in roofed shelters open to an enclosed stock-yard. Here they feed, standing knee-deep in straw from the cornfields, consuming green crops and grain as well as imported foodstuffs. With plenty of food supplies and a lazy life they fatten quickly and yield tender, young beef of the highest quality. The trodden and manure-sodden straw gives a valuable fertiliser for the next season's crops. The skilful farmer so arranges his plans that the acreage under each crop in a particular year not only fits his rotation scheme, but also enables him to feed the maximum number of animals and thus reduce as far as possible the amount of money to be spent on artificial manures. Another point in favour of this system when properly managed is that it provides work for the workers on the farm all through the year. On a farm growing corn only there is much work to be done in the seasons of ploughing, seeding, and harvesting, but little at other times. Too much or too little rain causing poor crops may rob the corn-grower of his year's profit and an outbreak of disease cause great loss to the dairyman, the cattle breeder, or the sheep farmer. The mixed farm is unlikely to be unprofitable in all its departments in the same year.

Towns.—The eastern agricultural counties are generally areas of large villages and small towns scattered evenly over the countryside, each a few

miles from its neighbours. In the villages are found the craftsmen who repair the farm machinery and utensils, make fencing and gates, and maintain the farm buildings. The towns provide manufactured goods for the use of the farmer and his family and are the homes of the doctors and lawyers, veterinary surgeons and auctioneers, who see to other of his needs. But their main importance lies in their markets. Some have regular weekly markets for the sale of cattle and sheep and poultry. Others have fairs at special seasons of the year, when great numbers of animals or the year's crops of grain and fruit are disposed of to buyers from distant districts. Nowadays these are of less importance than formerly, because much of the produce is sent direct from the farm to the markets in the industrial districts. This is nearly always the case with fruit and vegetables and is becoming more and more common with animals. In this way the motor-lorry is helping to check the growth of the country market town. The greater railway lines, such as those from Norwich, Cambridge, and Bedford to London, play the same part. At certain seasons fast goods-trains run through the night to carry fresh vegetables from the market-garden districts to northern and Midland towns in time for the early-morning markets.

Some of the old market towns have grown to considerable size through the development of industries originally dependent on the products or the needs of the farming population. The hides of locally-reared cattle and the need of the farmer for strong, weather-resisting boots have together encouraged the boot and shoe industries of such centres as Northampton, Leicester, and Norwich. The mustard factories of Norwich and the jam

factories of Cambridge depend on locally-grown crops, whilst the barley crops find their way to breweries situated in many eastern towns. On the other hand, the demand of the farmers for types of plough, harrow, and harvesting machine suited to local soils and crops has encouraged the growth of factories making agricultural implements, though all the necessary raw materials—iron, steel, and fuel—must be brought from other districts. Lincoln and Ipswich are two examples of such factory centres. In the same way, the demand for wooden equipment has helped to establish woodworking firms in Norwich. Sometimes from these beginnings general engineering works have developed, as at Gainsborough and Bedford. The production of road-making and drainage implements at Lincoln has come about in this way.

The coastal towns are usually quite small, the most important being those engaged in the fishing industry. Great Grimsby on the Humber is much the largest. Yarmouth and Lowestoft mainly engage in local herring fisheries, while Grimsby deals with the trawlers fishing in the North Sea areas, such as the Dogger Bank, and in the more northern regions bordering on the Arctic ocean. Harwich has fast steamer traffic with Holland, similar to the cross-Channel services from Dover to France. The relatively dry, sunny summers of the eastern counties have helped the growth of holiday resorts, especially on the Norfolk and Lincolnshire coasts, where sandy beaches occur.

CHAPTER XV

LANCASHIRE AND YORKSHIRE

Moorlands and Rivers.—The two counties of Lancashire and Yorkshire together make up the whole width of England between the Irish Sea and the North Sea. North and south in a wide central belt runs the Pennine upland, a great mass of moorlands and the most extensive upland region in England. It is higher on its western edge, and the steep slopes on this side form the boundary between the two counties, though two off-shoots from it stretch westward into Lancashire, north and south of the deep valley of the Ribble. The Pennines themselves are almost cut in two in the same district by the valley of the River Aire, one of the tributaries of the Yorkshire Ouse. This valley, often called the Aire Gap, with that of the Ribble provides the easiest crossing of the range, and the upper Ribble valley provides an easy western way northwards to the Vale of Eden and so to Scotland.

The Pennines consist of great, gently-rounded ridges with almost flat tops. These are separated from one another by wide deep valleys, the Yorkshire *dales*. The contrast between the bleak, barren, and almost uninhabited moorlands and the sheltered farmlands of the dales with their pleasant villages and old market towns strung out along the river-banks, is very striking.

Often the slopes of the valleys appear as though they had been constructed in terraces. This is

because they are composed of varied rocks, differing in the resistance they offer to the weather. The limestones and harder sandstones give very steep slopes, sometimes almost vertical rocky crags, over which the streams descend in waterfalls or cataracts. The softer shales form the flatter areas where sometimes the streams spread over the land and form marshy tracts.

The steep western edge of the Pennines rises like a wall in the face of the south-westerly and westerly winds and so causes a heavy rainfall over the neighbouring districts, a much heavier rainfall than is experienced on the eastern, Yorkshire side. Much of this rain finds its way at once into the rivers. Where the limestone rocks underlie the surface, however, their numerous vertical cracks or joints allow a good deal to make its way underground, sometimes for long distances. Some of this water comes to the surface again in springs, where the limestone rests on beds of shale through which it cannot find a way. Rainwater, especially after it has passed through beds of peat, can dissolve limestone, and so sometimes the underground water gathers into streams which emerge as full rivers far from the points at which the rain fell on the land surface.

Not far from the flanks of the great range are many industrial towns whose dense populations use, in home and factory, enormous quantities of water. The higher Pennine valleys, with their heavy rainfall and scanty population, provide excellent conditions for collecting it in reservoirs to serve these urban districts, and many of them are so used. Though the waters thus gathered are free from impurities harmful to health, they all contain some dissolved

substances. Everyone is familiar with the stony coating or "fur" which forms inside the domestic kettle. It forms in boilers too and leads to a waste of the heating fuel as well as tending to choke the tubes and pipes connected to the boilers. The industrialist therefore tries to avoid the use of water containing much dissolved matter. Water which has flowed over limestone rocks, because of their solubility, is particularly bad from this point of view, whilst that from sandstone or shale areas is usually good. The latter is better for washing purposes too. It lathers more easily with soap and is therefore commonly said to be *soft*, whilst limestone waters, which necessitate the use of much more soap, are said to be *hard*. The presence of salt in water is another cause of hardness.

Coalfields and Orefields.—Along the edges of the Pennine Range, where the foothills sink into the plains, occur the richest and most extensive of the English coalfields. The great Yorkshire coal-field stretches almost from Leeds to Derby and Nottingham, and from the moorlands to the Trent. On the west side are the corresponding, but smaller, coalfields of south Lancashire and the Potteries district of north Staffordshire. This easily worked coal is used by local industries, but great quantities are also distributed over the country and consumed in domestic fires and in gasworks. The main railway lines help in carrying the fuel far afield, much of it to the Midland cities and still more to London. The valleys of the rivers flowing across the coalfields provide easy routes for railway, canal, and road construction for this purpose. The ports along the Humber were thus easily supplied with coal for export overseas or for use on the vessels trading from

them. The workers in and around the mines live in large villages, often with populations as great as many of the south-country towns, but without the markets, ancient churches, and town buildings that the latter possess. Where industries have been developed the population is still larger and more crowded, and both the West Riding of Yorkshire and south Lancashire have many of these factory towns.

Coal, though the most valuable, is not the only mineral worked in these counties. The limestone districts of the Pennines are often cut by *mineral veins*, from which lead-ore has been worked since Roman times. In the last century or so zinc-ores have also been obtained from these veins. The amounts, however, are small and not nearly enough to supply all our needs. Iron-ores are more abundant and much more important. The Cleveland Hills, on the northern edge of the North York Moors and close to the mouth of the Tees, were for a time the main iron-mining region in Britain. More recently they have been outstripped by the mines of the Scunthorpe district, just across the Trent into Lincolnshire and a few miles south of the Humber.

Iron and Steel.—The presence of these ore deposits not many miles from the Pennine coalfields has led to a great development of the iron and steel and engineering industries. In the West Riding of Yorkshire the iron industry is far older than the Cleveland or the Scunthorpe mines. It probably began with the smelting of ores found on the coalfields in the days when charcoal, obtained from the local forests, such as Sherwood Forest, was used as fuel. Sheffield was one of the first steel-manufacturing towns and it had a great reputation for cutting implements a

couple of centuries ago. It still imports from abroad very pure iron, better than that which English ores provide, for this side of its trade ; but many other branches of the industry have been set up, which



FIG. 59. The South Yorkshire Coalfield

How does the map suggest that the iron and steel industry of Sheffield arose before the ore mining at Scunthorpe ? What is the importance of the limestone quarrying in the Pennines ? What other Pennine quarry product is industrially important ?

use much of the Lincolnshire ore. The Cleveland ores were particularly useful because the southern part of the Durham coalfield, a few miles away across the Tees, provided the best coking coal in Britain. Many blast-furnaces were therefore set up at Middlesbrough to produce pig-iron. The steel

industry which followed specialised in constructional work, such as the large steel structures needed for bridges and docks. These could be quickly and easily loaded on board ship for export to foreign lands. Thus it is that far away in Canada and Africa, India and Australia, one may come across great railway bridges bearing the name of some Tees-side firm. Besides its cutlery, Sheffield manufactures munitions of war and armour plates for battleships. Leeds and Manchester play a part in the industry too, the former producing such things as fire-grates and spouting and the latter spinning, weaving, and electrical machinery.

Textile Industries.—Nearly as important as the products of the steel and engineering industries are those of the textile factories of Lancashire and Yorkshire. The iron and steel towns have greater rivals in a few centres abroad, but few other districts in the world even approach Lancashire for the quality and quantity of its cotton goods or Yorkshire for its woollen materials. From just south of the Aire Gap to the High Peak district of Derbyshire the Pennine limestones are buried deep beneath a covering of sandstones and shales. The streams flowing from this district are therefore composed of soft water, and this is the main reason for the concentration of the textile factories. Both wool and cotton have to be washed and dyed in the manufacturing process. When hard water is used it makes the fibres stiff and brittle, liable to break and therefore not easily spun or woven, whilst soft water leaves them as bright and elastic as before. Cotton fibres become brittle in a dry atmosphere too, and hence they are spun on the wetter western or Lancashire side of the range. Lancashire makes a



Photo : Aerofilms

FIG. 60. A West Riding Industrial Town—Halifax

Note the valley site with its railway, complete with large storage sheds and goods yard. Where does the railway vanish to in the background? Most of the factories are near the railway. Why? Next come the shopping streets and then the residential areas.

great variety of cotton cloths, from heavy, closely woven material for sheets to light materials like muslin ; and Yorkshire makes an equal variety of woollen materials, from heavy stuffs for blankets and winter overcoats to lighter cloths for summer suits. Both also produce many yarns, or threads, which are sent to other districts for weaving and knitting. The *mills*, or factories in which these products are made, are often vast buildings of many storeys, covering great spaces of flooring. Hundreds of spinning or weaving machines occupy the huge rooms. The making of garments gives work to

thousands of men and women in the larger town centres, such as Manchester and Leeds, but the spinning and weaving mills are mainly found in the lesser towns. Oldham, Bury, Bolton, and Burnley are amongst the more important of the cotton factory towns. Bradford and Halifax have woollen factories.

Farming.—Away from the Pennine coalfields, on the lower-lying lands, are the farming areas. Both counties, though best known for their industries, are also amongst the leading farming counties of England. The York Plain and the lowlands of west Lancashire have fairly light soils which are heavily cultivated. Barley for the local breweries is an important crop in Yorkshire, whilst the Lancashire district is second only to the Lincolnshire fens amongst the English potato-growing districts. The wide valleys or dales, stretching far into the Pennines in the northern districts beyond the edge of the coal-mining and factory regions, are great milk-producing areas, while the low chalk hills of the Yorkshire Wolds are largely cultivated and give not only wheat crops but much winter food for sheep.

Ports.—The industries of the northern counties give rise to much foreign trade. The sheep of the Pennines, York Moors, and Wolds no longer provide enough wool for the West Riding factories and much has to be imported from Australasia, South Africa, and South America. All the cotton for the Lancashire factories, of course, must be brought from the warmer lands, such as the south-eastern United States, Egypt, and India, where it is grown. Then, too, these great town populations need far more food than the English farmer can provide and this also must be brought from foreign countries. On

the other hand, coal-mines and iron works, engineering and textile factories produce much more than our people at home require. Their products go abroad to pay for the food and raw materials. It is not surprising, then, that great ports, provided with extensive docks and warehouses for the handling of these cargoes, have had to be constructed. Liverpool is still much the greatest of them, even though the building of the Ship Canal to Manchester, has taken some of its trade to the latter city. On the North Sea side Hull and Goole share the trade, dealing especially with goods for or from the continent of Europe.

CHAPTER XVI

LANDS OF THE BORDER

The Northern Uplands.—The border counties of Northumberland and Cumberland include a great central mass of Pennine moorlands which is continued across the Scottish boundary by the Cheviot Hills and the wide-stretching hill country of the Southern Uplands. For many centuries the great lords of the border were constantly at war with one another, and neither the kings of England nor the kings of Scotland had much control over them. The lesser families were noted cattle-stealers who rode out to raid the flocks and herds of their neighbours over the border whenever conditions seemed favourable. The wild moorlands were difficult to watch and formed a kind of no-man's-land between the two countries. As on the Welsh border, great castles were built to check the movement of armies, but these gave little protection to the farmers, who therefore turned their farmhouses into fortified places. Just exactly where the boundary ran no one knew and few cared. Except when the two countries were at war the hills formed a country without a king and their people went their own way.

Most of this border country is not much use except as pasture land. Sheep are reared on the better drained hills, especially on the Southern Uplands, and cattle in the valleys. Lowlands occur only in the wider valleys of the Eden, the Tyne, and the Tweed and in narrow strips along the coast.



[Photo : Val Doone]

FIG. 61. A Farm near the Cheviot Hills, Northumberland

The crossed pattern on the big field is formed by lines of young trees being raised for forest planting. To what other use could this land be put? Why are there few farm buildings?

Conditions are better suited to farming here. The lower parts of the Tweed valley grow fine crops of wheat and the rainier western lowlands around the Solway Firth are noted potato lands. The Tyne valley and the coastal districts of Durham and Northumberland are fine cattle lands, the original home of the famous Shorthorn breed. The sheep of the Cheviot Hills and the Southern Uplands are noted for their fine wool, and this gave rise to the long-established industry of the Tweed valley towns, such as Hawick and Galashiels. Originally these produced

heavy, home-spun and hand-woven cloths known as "tweeds." Nowadays these are largely made by machinery in the Yorkshire mills and the factories

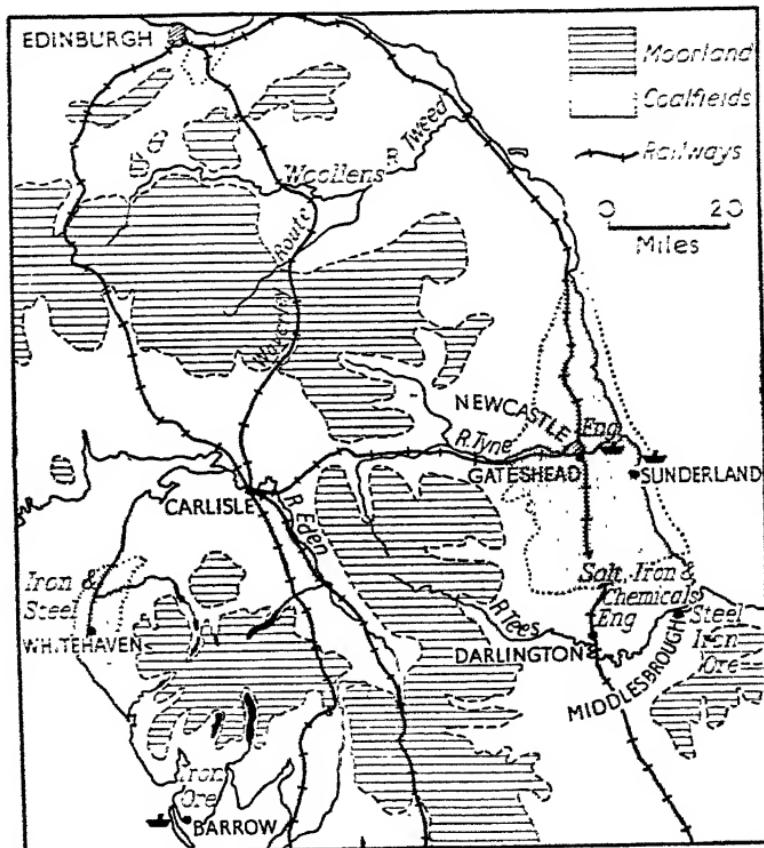


FIG. 62. The Borderlands—Industries

on Tweed-side have taken up the manufacture of fine and soft woollen underclothing. The soft waters of the Tweed streams suit this industry.

Traffic between England and Scotland must somehow pass over or around this hilly country. The

East Coast route coming from York crosses, one after the other, the rivers flowing from the Pennine dales, but is forced nearer and nearer to the coast as it goes north. It crosses the Tweed at Berwick only a few miles from the sea and makes its way to Edinburgh through the narrow gap between the Uplands and the coast. The midland and the West Coast routes, having climbed the high moorlands linking the Pennines to the Lake District mountains, pass down the Eden valley to Carlisle. From there they must cross the Uplands and in doing so use the river valleys wherever possible. The most direct route leads over the highland to the Clyde valley and then divides into two, one line going on to Edinburgh and the other to Glasgow. A less direct route passes over into the Tweed valley and then makes its way north to Edinburgh. Yet another route crosses the Scottish coast-lands of the Solway to Stranraer, from whence regular steamships sail to Ireland. A low pass, the Tyne Gap, provides an easy way across the Pennines and is followed by the important road and rail routes between Newcastle and Carlisle.

The Lake District.—The high moorlands separating the Ribble valley from the Eden valley join the Pennines to the Lake Mountains. Here are to be found the largest lakes in the country—Windermere and Ullswater—and a score of lesser ones. The mountain peaks are amongst the highest in Britain and the rainfall the heaviest in England. The region is famous for its fine scenery and a favourite resort for those who like a strenuous holiday, rambling or rock-climbing on the high slopes of Scafell or Helvellyn. The woodlands of the more sheltered valleys add to the beauty of

many lakeland scenes. Pastoral farming and a little quarrying in some districts do little to interfere with the tourist industry, which is the main source of wealth for the people.

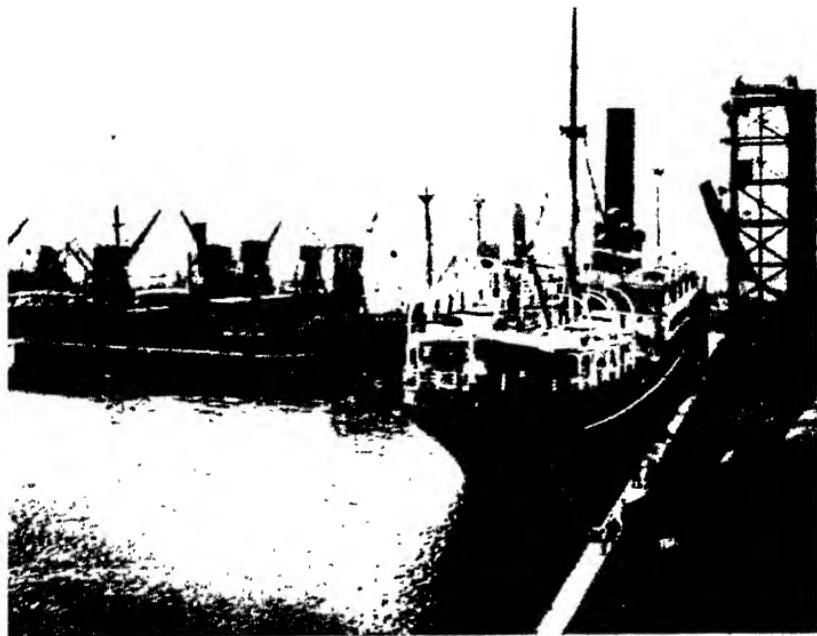
Coal, Iron, and Ships.—The population of the English border counties is much greater than that of the neighbouring Scottish counties because of the presence of coalfields in the former case and their absence in the latter. West of the Lake Mountains a narrow coalfield runs along the shores of the Irish Sea. Some of the mines are now extracting coal from seams far out from the coast and deep beneath the sea-bed. Near at hand and a little farther south, close to Barrow-in-Furness, first-class iron-ore used to be mined. It is now almost exhausted, but it helped to give rise to iron smelting and steel-making on the coalfield and this still goes on at Workington. The ship-building industry of Whitehaven is now dead, but important modern yards are active at Barrow, building both naval craft and trading ships.

The Northumberland and Durham coalfield is much larger and far more important than that of Cumberland. It was probably the first English coalfield to be extensively worked, was the first to send coal by sea, and is still one of our main coal-producing regions. Its export trade is now much reduced and it sends far less quantities than formerly to the European countries, such as Scandinavia, France, Spain, and Italy, which have little or none of their own. London has received coal by sea from this area for over four hundred years.

The need for strong and specially designed craft for this trade led to the establishment of shipyards on the banks of its rivers. At first the ships were built of local timber from the dales and then of

timber imported from the Continent, but the industry became most important when ships were made of steel. The Durham coals included some which made first-class coke for the blast-furnaces. Ore could be brought cheaply by sea from Cleveland, Scandinavia, and northern Spain. The iron and steel industry grew with the ship-building industry, and the three main rivers—Tyne, Wear, and Tees—all had suitable sites for building and launching vessels. For many years this was the main ship-building region in Britain and that meant the main one in the world. More vessels, and of greater capacity, were launched from the Tyne than from anywhere else. In recent years it has lost that position, being surpassed especially by the Clyde, mainly because the greatest modern liners are too long to be built in the yards on the Tyne and too large to be safely launched in so narrow a river. It is still an important builder of moderate-sized ships and especially of craft for special kinds of cargo, such as oil, meat and fruit.

On the coalfield the bulk of the people live in large villages. Agricultural markets, and therefore market towns, are few. There are few factory industries, such as those of the Black Country or of west Yorkshire and south Lancashire, and therefore few factory towns. The main centres of population are the coal-exporting ports and the adjoining ship-building centres. Newcastle-on-Tyne is much the largest city, and the twenty miles of river from that town to the sea is lined with smaller towns on both banks. All share in ship-building or overseas trading. The Wear has no such long navigable waterway, and these industries are therefore limited to the one port of Sunderland. The Tees is still less suitable by reason of the shallowness of its estuary,



[Courtesy Railway Executive, Eastern Region]

FIG. 63. A Steamer Bunkering at a North-Eastern Port

A Chinese steamer in the dock is about to fill her bunkers for the voyage. Note the full wagons, the hoist and the loading shoot. Ships at the other berths are loading and unloading cargo.

and so Middlesbrough on the Yorkshire side and the Hartlepools on the Durham side are virtually on the open coast. Between the two but still on the Durham side is the new town of Billingham, with great modern chemical works, built here because of the local supplies of coal, salt, and limestone, and the ease with which supplies of other raw materials can be imported.

CHAPTER XVII

THE SCOTTISH LOWLANDS

Valleys and Estuaries.—The middle region of Scotland forms a narrow waist joining the two much wider upland regions to the north and to the south. The general level of the country in this belt is much below that of the lands on either side of it, but that is the only good reason for calling it the Lowlands. The country is not a true lowland plain. It is rather a region of many valleys, separated from one another by hill masses far higher than those of south-eastern England. The greatest lowland area is Strathmore, a wide vale stretching from the North Sea coast south-westwards towards the mouth of the Clyde and bounded to the north by the steep edge of the Highlands. From the Highlands issue two of the main Scottish rivers, the Tay and the Forth, and their lower courses form important low-lying districts. The Clyde flows in the contrary direction, from the heart of the Southern Uplands, and its lower valley provides another lowland strip. Lesser patches of low country are found on both coasts.

These main valleys provide the best farming lands in Scotland and contain its chief industrial districts. What is perhaps more important is that they terminate in great estuaries, the Firths of Clyde, Forth and Tay, surprisingly large inlets to such relatively small and unnavigable rivers. These sheltered waterways had long been used by shipping, and so when ocean trade developed and Scottish industries



[Photo by Valentine, Dundee.]

FIG. 64. Dundee and the Firth of Tay

Note how the estuary widens to the North Sea. The cape on the north shore gives some shelter to the port. The city is crowded between the steep hill from which the photograph was taken and the shores of the Firth. What industry accounts for the many chimney stacks?

grew each came to support an important port. The chief of these are Glasgow, Leith, and Dundee.

The scattered hills and the network of valleys settled the pattern of road and railway routes. One group of these, issuing from the Southern Uplands, runs north-westwards towards the Highlands and their valleys. The other runs south-westward from the North Sea towards the Clyde and its estuary. Edinburgh and Glasgow are at the points where the southern ones, the so-called East Coast and West Coast routes, reach the heart of the Lowlands. Stirling is at the point where these routes, now combined, cross the marshy lower plain of the Forth. Perth stands where the Highland routes, coming down the Tay valley, join the East Coast route from Aberdeen, to pass south to Stirling through a wide gap in the hills. To shorten the journey along the eastern coasts two magnificent railway bridges of great length have been built—the Forth Bridge, a

little north-west of Edinburgh, and the Tay Bridge. south of Dundee.

The lowlands around the firths are the chief agricultural areas of Scotland, but there is a great difference between those on the west and those on the east. The Firth of Clyde and Ayrshire lowlands are open to the Atlantic winds and therefore are milder in winter and have considerably more rain all the year than the Tay and Forth lands. The western coastlands have many dairy cattle and the potato is an important crop. The shores of the Firth of Forth, on the other hand, grow a good deal of grain and the more sheltered lands of the lower Tay and its estuary provide Scotland's chief fruit-growing area. The fruits grown are mainly bush and soft fruits for jam-making rather than tree fruits, cherry and apple, such as are found in the orchards of southern England.

CoalfIELDS AND INDUSTRIES.—It is not mainly owing to their more fertile soils, however, that the Scottish Lowlands are so much more densely peopled than the rest of the country. Three of the four really large towns in Scotland and most of its smaller ones are found here, and it is industry, not agriculture, that explains their presence. Over much of this narrow belt of country stretch three coalfields. Two reach to the sea and, like the Northumberland and Durham and South Wales fields, were until recently much interested in the export trade in coal. The Ayrshire coalfield on the west is the least important. It supplies a good deal of coal to Northern Ireland, which has no mines of its own, and has one important industrial town, Kilmarnock, and several smaller ones engaged in textile trades and some branches of engineering.

The eastern or Forth coalfield is cut into two portions by the Firth, but already mines on the northern shore have begun to extract coal from beneath the waters of the estuary. Export to the Baltic lands of Europe was carried on for many years from Leith and smaller ports. In return, such things as timber, wood-pulp for paper-making, flax and hemp for linen and ropes, and iron-ores were brought back, and all these helped to establish a group of industries in the Lowland towns.

The central or Lanarkshire coalfield is, however, still the most important both in the area it covers and in the amount of coal mined. To-day practically none of its output is exported. Instead the coal is used on the field itself, or near at hand, for it supports the major Scottish industrial region. It was on this coalfield that the iron industry of Scotland was first established. Falkirk has one of the oldest ironworks in Britain and the steel and engineering industries are found in a number of other towns nearby.

Glasgow and the Clyde.—The main industrial region of Scotland stretches from Glasgow in a fairly narrow belt along the banks of the lower Clyde. The Lanarkshire coalfield provides the necessary fuel and much of the machinery and steel products used. The fine waterway of the lower Clyde made easy the establishment of ports. Its low, flat banks, stretching well back from the river, and its sheltered position provided the opportunity for developing shipyards capable of building the largest vessels. Many of the largest passenger liners have been built here, as well as hundreds of cargo vessels. Clyde-built ships, their engines tended by Clyde-trained engineers, are found in every port. Like Bristol

and Liverpool, Glasgow shared in the American trade almost from its beginnings, and some of its industries have grown out of that connection. Thus cotton imports from America led to the local cotton

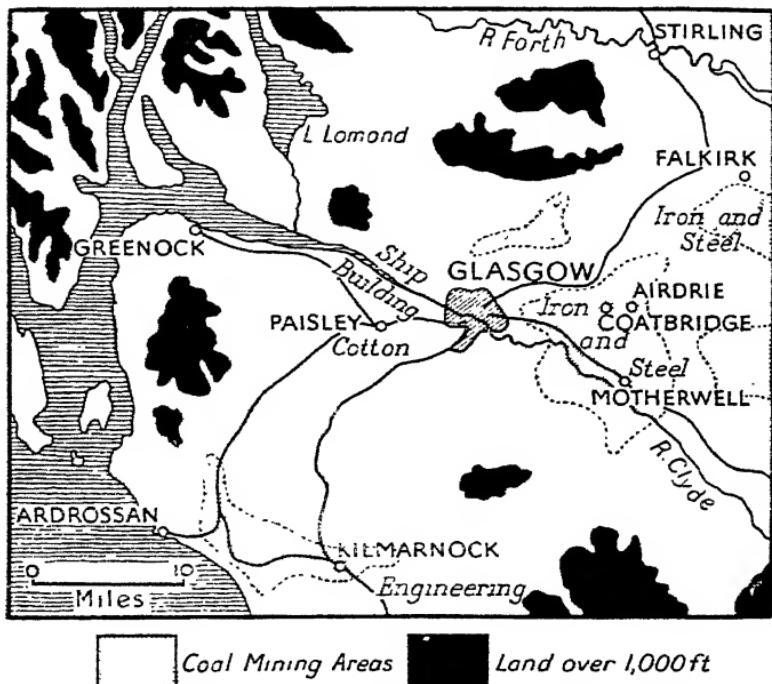


FIG. 65. The Clyde Industrial Region

Note how the long navigable estuary of the Clyde enabled the port of Glasgow to develop in the heart of the industrial region. Compare with Hull and Liverpool in this respect.

industry, of which sewing cotton is an outstanding product. In the same way West Indian sugar and American tobacco support the local sugar-refining and tobacco factories. Some branches of engineering and the manufacture of chemicals are other industries carried on in the region. The ship-building industry

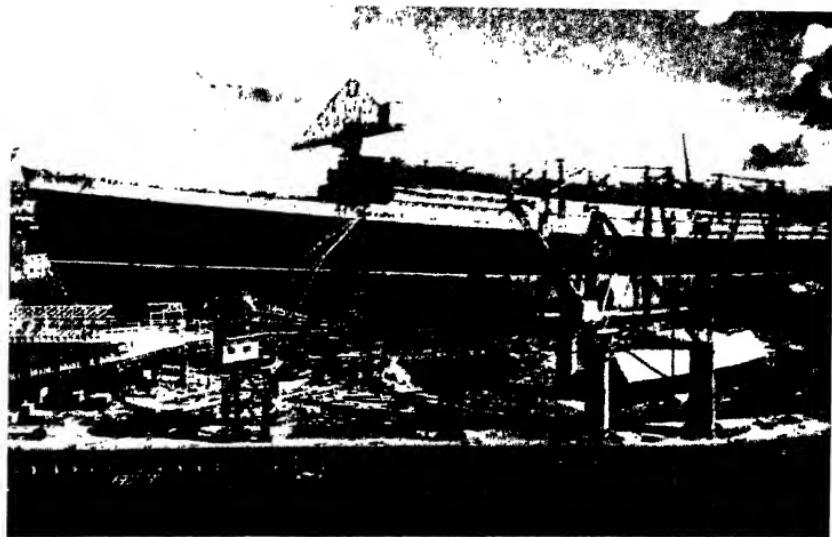


Photo: Stewart Bale

FIG. 66. The "Queen Elizabeth" Building at Clydebank

The ship is nearly ready for launching. Note the many lofty cranes used to lift material for her decks and superstructure. What work still remains to be done on the ship?

calls for the help of many trades in providing equipment needed for the vessels built.

Perhaps Glasgow's greatest importance, however, is as a port. Besides the raw materials needed for Scottish industries it imports great quantities of grain and other foods from North America, Australia, and the Far East. These are supplied not only to the local populations, but distributed over most of Scotland and much of northern England. It is the wholesale market for the islands and coastal districts of western Scotland and the products purchased are sent home very largely by means of coastal steamers. All these, together with the manufactured goods exported, make it one of the four greatest ports in Britain.

CHAPTER XVIII

THE SCOTTISH HIGHLANDS

Moorland and Glen.—The Highlands of Scotland form far the widest stretch of upland country in the British Isles. North of the Firths of Tay and Clyde they cover almost the whole country from sea to sea. Lower ground forms a narrow strip along the shores of the North Sea and some of the longer, eastward-flowing rivers occupy fairly wide valleys or *straths*. Though in many parts the land is over 3000 feet above the sea, there are scarcely any of the narrow rocky ridges and high peaks we commonly expect in a mountainous district. Instead there are wide moorland areas with great stretches of heather and coarse grass and much peat bog. On the west side these moorlands are cut by very deep, steep-sided and narrow valleys, called *glen*s, down which rapidly flowing streams run over rocky beds and through frequent pools to the sea. Whereas on the east coast the narrow lowland terminates in a regular coastline with few inlets, on the west each glen opens into a sheltered inlet or loch often reaching many miles inland from the open sea. The ridges between the glens form the long peninsulas that separate the lochs, and are sometimes continued out to sea by lines of rocky islands.

Off the northern and western coasts are numerous islands, generally very similar in feature to the Highlands. Some are much lower, though others are mountainous, but all are generally moorland in

character. The Inner and Outer Hebrides, the Orkneys, and the Shetlands are the four main groups.

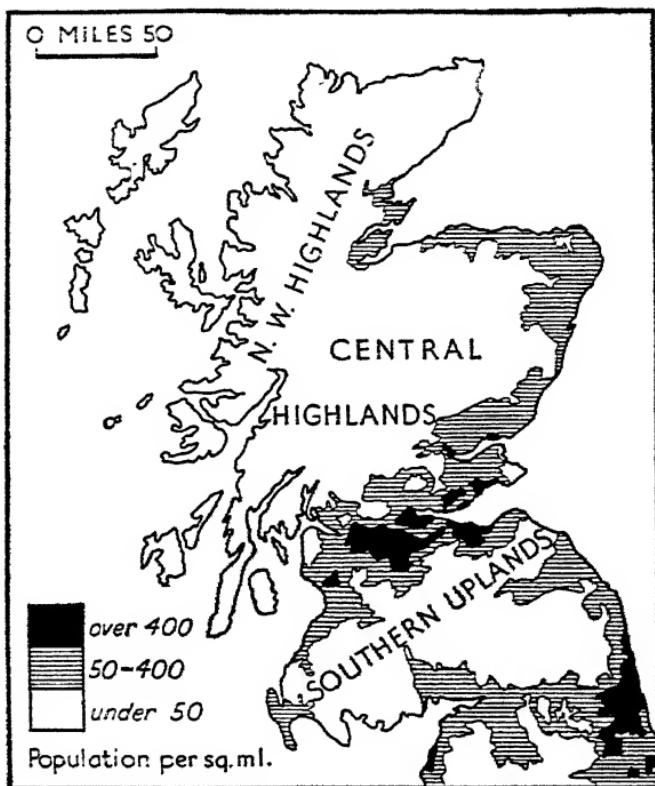


FIG. 67. Scotland—Density of Population

Note (i) the low populations of the higher areas ; (ii) the dense concentration in the Lowlands ; (iii) the moderate population of the east coast regions in contrast to the very low population of the west coast.

Mists and Snows.—As this highland region occupies the most northerly parts of Britain it would be expected to be cool in climate. Its height increases the cooling effect of its northerly latitude. Winds sweep unhindered over its surface and add to the

general bleakness of the climate. The ocean keeps the western districts warmer in winter than might be expected, but this effect is not felt far into the interior.

The westerly and north-westerly winds from the Atlantic carry moist air over the land, and, the highlands causing its temperature to fall, there is therefore much condensation. Rainfall is heavy everywhere in the hills and especially amongst the higher ridges of the west. Even when the cooling is not sufficient to produce rain it leads to the formation of dense, low-lying clouds, which shut out the sun and wreath the summits of the ridges in thick, wet mists. In the winter months the north-westerly winds, more particularly, cause heavy snowfalls, which sometimes block the roads for weeks together.

The eastern portions of the highlands and the lowlands bordering the North Sea are less rainy, partly because the more prevalent Atlantic winds have given up much of their moisture before reaching them and partly because the easterly winds carry less moisture. On the other hand they have lower winter temperatures than the coastal districts of the west.

Life in the Highlands.—The population of the Highlands is less in number and more scattered than in other parts of Great Britain. Coal and other minerals are almost entirely absent and therefore manufacturing industries have not developed to give rise to large towns. Even agriculture is very limited, for it is heavily handicapped by unfavourable conditions in most areas. Soils are generally thin and infertile and sunshine too weak to ripen grain crops. Even on the drier and sunnier eastern



Photo : Robert M. Adam

FIG. 68. Looking North-east along Glenmore

Note the trench-like form of the valley. In the foreground is Loch Oich, in the background Loch Ness.

lowlands the farmer grows mainly root-crops, such as potatoes, turnips, and oats. Pastures are good, however, and many cattle are reared and hill-sheep fattened for market.

Wide stretches of the moorlands are put to little use and are left to the grouse and deer, which provide for the sportsman's entertainment in the summer and autumn months. Salmon and trout fishing in river and lake bring other people of the same kind. The more striking scenery of some regions attracts tourists. These visitors provide employment for many of the Highland people during certain months. Where there is sufficient rough pasture, cattle or sheep may be raised—mainly for meat in both cases. The areas are too remote from the densely peopled industrial districts to provide them with

milk, even if the pastures were good enough for dairy cattle, and the climate is too wet and cold for the sheep to have fine, soft-woolled fleeces.

In the coastal districts of the west and on the islands farming is often combined with fishing. The farm includes a stretch of moorland pasture on which a few sheep feed in the summer and from which may be cut peat for fuel and heather for thatching the farm buildings. On the lower slopes, where the farmer has cleared the heather and cut ditches for drainage, will be a small field or two of grass, providing pasture for a cow, some winter pasture for the sheep, and a small stack of hay. For crops he may have a few acres of oats and a patch of potatoes and cabbage. The women-folk will spin and weave or knit the wool from their own sheep to clothe the family, as well as taking a share in the farm work. Two or three families often join in the ownership of a boat which they use for local fishing, usually only to supply their own needs. Such things as flour and sugar, boots and tobacco have to be brought from the Lowland cities. These are generally carried to the little harbours by small coasting steamers from the Clyde.

At certain seasons shoals of herrings, though fewer than formerly, appear in these northern seas and boats put out from northern harbours, such as Stornoway, on the Isle of Lewis, and Wick and Aberdeen, on the North Sea coast, to capture them. The herrings are cured and salted in the ports and can then be sent long distances to market. The bigger places send out boats to the more distant fishing grounds too, but they cannot compete with the great centres of this industry on the East Coast of England.

Highland Travel.—Means of communication are few and poor in nearly all parts of the Highlands. The mountainous nature of the land makes the building of roads and railways difficult and costly. The country is so thinly peopled that passengers are few, and goods for transport are scanty too. In the western districts only the summer tourist makes it worth while to maintain railways, and passengers and mails provide most of the income. On the east coast and in its valleys construction is easier and goods and passengers more plentiful. The main east-coast route passes north through Aberdeen, and the central Highland route, using the Tay valley for part of the way, joins it at Inverness. The main western route runs from Stirling to Oban. The islands are reached by steamer from the ports, such as Wick and Oban, where the railways end. Most of these vessels follow regular time-tables on their journeys from island to island or from one tiny coastal town to another. The services are more frequent in the summer, when many tourists have to be carried. A few great trunk roads follow similar routes to the railways and have branch roads to the village centres. The development of air transport has provided the traveller with a swifter means of reaching the outer islands.

CHAPTER XIX

IRELAND

Moorland, Fen, and Valley.—Lying west of the central parts of the main island of Great Britain, Ireland faces the open Atlantic. Unprotected by any great highlands, it is freely swept by every ocean wind. Though it is nowhere penetrated by great estuaries or firths, the influence of the sea reaches every acre of its surface. Most of its winds are ocean winds and these give it a mild, damp climate which is quite characteristic. Snow is uncommon and seldom lies on the surface for more than a day or two ; rainfall is seldom absent anywhere for a long enough period for the grass to begin to turn brown. Heavy rainstorms are uncommon and few places, even the most exposed, have the heavy rainfalls met with in the Western Highlands of Scotland or the English Lake District or the mountain lands of Wales. Gentle rain and mild temperatures are the main features of the climate.

A wide lowland, the Great Plain, covers a rectangular area from the Atlantic to the Irish Sea. North and south of this the land is broken with wide, shallow valleys and low ridges, generally running north-east and south-west. Only on the outer edges are there hill groups whose highest points exceed 3000 feet. The plain is covered by deep, clayey soils through which the rain cannot penetrate. It collects in the wide basins to form shallow lakes and converts much of the land

into wet, ill-drained fenlands or *bogs*, where water-loving plants flourish and when they die form the

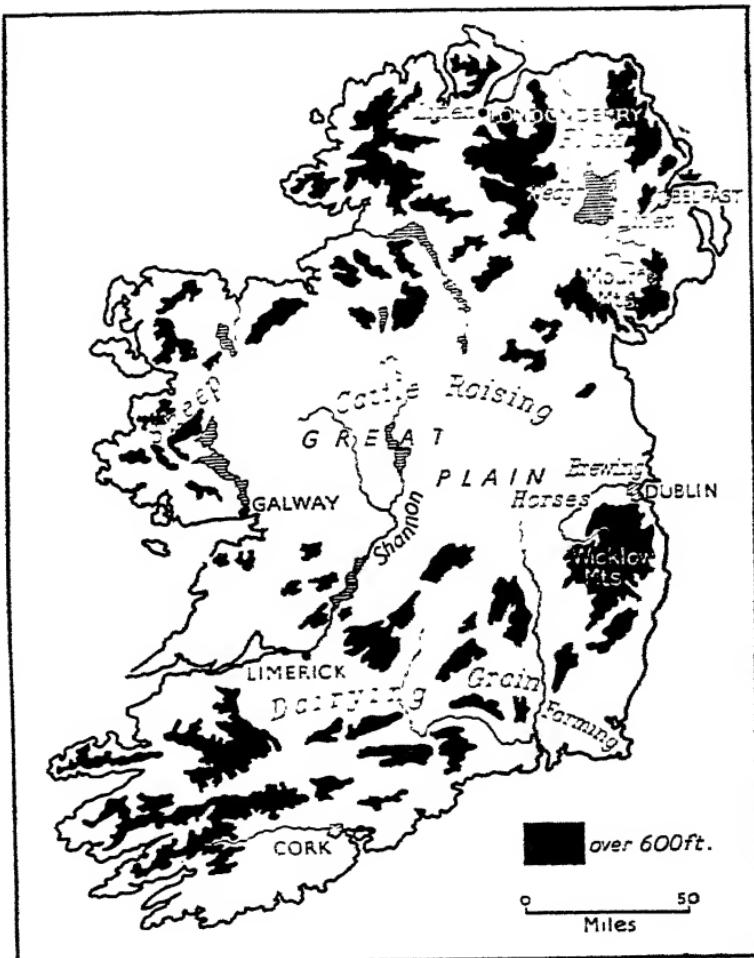


FIG. 69. Ireland—Agriculture and Industry

lowland peat which is widely used as fuel. The hill and valley country has rather more rain, but is better drained by long, slowly-flowing rivers. Here



[Photo : T. H. Mason

FIG. 70. A Farm in Co. Sligo, Ireland

Note the small, carefully tended fields, dry stone walls, thatched roof. The farm is situated where the Plain rises to the western hills. How has this affected the drainage and the utilisation of the land?

are the fresh green pastures which have given to Ireland its nickname, the "Emerald Isle." The more mountainous outer fringe has, of course, because of its height, a greater rainfall. Its thin, infertile soils and its exposure to winds make this kind of country similar to the Highlands of Scotland, and wide areas of the north and west are peaty moorlands.

The west coast is very irregular, broken by loughs, similar to the Scottish lochs, in the north-west and by a series of drowned river-valleys in the south-west. Galway Bay breaks through the mountain fringe to the Great Plain on the west, and the plain reaches the Irish Sea on the east between the Mourne and the Wicklow Mountains. This latter break in the mountainous rim forms the main entrance to

Ireland from Great Britain, and is sometimes referred to as the Dublin Gate. It faces the Midland Gate, the lowland gap between the Pennines and the Welsh mountains.

The Industrial North.—Ireland has no great mineral wealth, either coal or ore, and is therefore, unlike the neighbouring island, essentially an agricultural land. It has no industrial regions like the English Midlands, Glamorgan or the Lower Clyde. Only in Northern Ireland are there industries of great importance, and even here more than half the population gains a livelihood from the land. Its inhabitants form nearly one-third of the Irish total, though Eire covers five-sixths of the island. The industries of Belfast and Londonderry largely account for this difference, but not entirely. A larger proportion of the land of Northern Ireland is under crops, and thus supports more people than the mainly pastoral areas of Eire.

Two of the industries of Northern Ireland depend upon its crops. The fertile soils of Antrim are suited to the growth of flax and its surface waters are excellent for the retting of its stems—that is, the decaying of the soft portions, which sets free their fibres. These fibres are combed and then spun and woven into linen. The two latter processes are carried on in the factories of Belfast and many of the smaller towns of Ulster. As in the case of the 'Yorkshire woollen industry, the factories have long outrun the supplies of home-produced supplies and now largely depend on imported raw material. The farmlands of the Lagan valley have enough sunshine to ripen crops of barley, which have given rise to the brewing of beer and distilling of whisky, in Belfast especially.



Courtesy of Film Producers Guild, Ltd.

FIG. 71. Retting Flax in Ulster

The sheaves of pulled flax are being spread in the pool so that the soft parts of the stems may rot and thus loosen the long fibres.

The sheltered, low-lying shores at the head of Belfast Lough form excellent sites for shipyards. Though all its supplies of fuel and steel plates and girders have to be brought over from Great Britain, it has, nevertheless, grown into one of the greatest ship-building centres in the world. Though it cannot equal the output of the Clyde yards, it rivals that of the Tyne and Barrow. It is particularly concerned in the construction of passenger liners.

Eire.—The population of Eire is almost entirely engaged in agricultural pursuits. Dublin is its only large city. Inland towns are not much bigger than English villages and are mainly market centres for

the sale of rural produce. The frequent rains and absence of bright sunshine and summer heat are against the growing of crops. On the other hand these conditions suit the growth of grass, which is further helped by the mildness of the winter temperatures. Farming is therefore pastoral in character, concerned with the rearing of animals. Hay is far the most important crop. Potatoes are the chief food crop and are largely fed to the farm animals as well as used for human consumption. Grain crops seldom ripen well. Oats is the most widely grown cereal, though barley is important in the rather drier and sunnier south-east.

The boggy plain is used for the rearing of cattle. The calves are sold to the farmers of the Dublin area, where forage crops can be grown for fattening, or shipped to England as store cattle to be fed for slaughter. The eastern districts are also famous for their horses, many fine racehorses and hunters being bred and trained there. The southern valleys are great hay-growing and dairying districts. The milk is sent to butter factories in the local towns and the waste butter-milk returned to the farms, where it is fed to pigs, thus giving rise to the bacon industry. The butter and bacon produced are mainly exported to England through such ports as Cork and Wexford. Limerick and Tipperary in the "Golden Vale" are well-known producing centres. The moorlands of the north and west struggle to feed their own populations, fishing being carried on all along the coast to add to the produce of the land, as in the Scottish Highlands.

The Trade of Ireland.—As in Great Britain, it is evident that Ireland cannot wholly feed her own people—not, however, because of the size of her

population, but because of the lack of many necessary foods. Important amongst her imports are such things as flour, tea, and sugar. Even her cattle need imported foods for their fattening, and large quantities of maize and cattle cake are brought in for this purpose. The linen and engineering industries of Belfast demand flax, coal, and steel from abroad and the brewing and distilling trades of both Dublin and Belfast use imported barley to supplement the local production.

To pay for these Ulster can export ships and linen, but Eire has no other resource than her pastoral products. Live cattle, beef, butter, and bacon are the chief of these. Great Britain takes most of them for the feeding of her city populations, and in return provides such manufactured goods as clothing and boots, hardware and implements, as well as coal, which the people of Ireland cannot provide for themselves. Three-quarters of Ireland's trade is with her larger neighbour, most of the goods being shipped from Dublin and Belfast, Cork and Wexford.

EXERCISES

CHAPTER I

1. Write down things you have learned about Britain (i) from journeys you have made, (ii) from people you have met.
2. The table gives the areas of the continents and the British Isles.

Asia	..	..	..	17	million square miles
Africa	..	..	..	11.5	" "
North and Central America	..	..	9	"	"
South America	..	..	7	"	"
Europe	..	..	3.8	"	"
Australasia	..	..	3.1	"	"
British Isles	..	..	0.121	"	"

Draw rectangles on equal bases to represent the areas of the separate continents. Try to show the British Isles on the same scale.

3. Find from your atlas the names of three archipelagoes and of three oceanic islands.
4. Draw a simple map of the British Isles and the continental coasts which face them. Name the countries across the narrow seas from Britain and one town in each.
5. Name some ways in which life in Britain differs from life in either China or India.
6. Make a list of products in (i) a greengrocer's, (ii) a grocer's, (iii) a draper's shop, either brought from overseas or made from materials brought from overseas. Opposite each product write the name of a country from which it is derived.

CHAPTER II

1. The sea destroys the land. Describe, with the help of sketches, some of the ways in which man seeks to prevent this destruction.
2. Draw a sketch-map of the coastline of south-eastern England from Harwich to Portland Bill. Show on it the North and South

Downs. Name the different types of coast feature shown. Mark in red where the sea appears to be gaining on the land and in blue where the land is gaining on the sea.

3. Make simple sketches to show the difference between a trawler and a drifter.

4. Draw up a table giving the conditions favourable to the growth of a port. Arrange these in a vertical column. Head other columns London, Glasgow, Hull and in these indicate whether each of the ports named possesses the conditions you have tabulated.

5. Draw two simple maps to help to show what has made Liverpool a greater port than Plymouth.

6. Draw a simple sketch plan of a shipyard. Show the spaces for the building of the hulls (berths), the engine shops, the edge of the waterway, a hull under construction and one having her engines fitted, the railway tracks bringing to the yard the materials needed.

CHAPTER III

1. Draw a map of the basin of the Yorkshire Ouse. Indicate its watershed by means of a heavy broken line. Name some of its chief tributaries. Mark the towns York, Leeds, Sheffield, Hull.

2. Find on your atlas map the Cotswold Hills, the Chiltern Hills, the Yorkshire Wolds. To which escarpment does each belong? Name two rivers which drain the land between the escarpments and two which cut through one of them.

3. What useful products are obtained from: (a) sheep, (b) cattle? Put them in two groups, separating those from the live animal and those obtained after it has been slaughtered.

4. Perth, Hawick and Carlisle all have great sheep fairs. Find these towns in your atlas and then say, for each, from what highlands the sheep sold probably come.

5. From whence is your local water supply obtained? Write its story from the rain cloud to your tap.

6. With the help of your atlas make lists of important towns in the British Isles belonging to the following classes:—(a) riverside towns; (b) towns at river crossings; (c) towns at river junctions; (d) towns not on the banks of a large river. What can you learn from these lists?

CHAPTER IV

1. The map on page 40 shows that the interior of Devon and Cornwall is cooler than the coastlands both in summer and in winter. Why?

2. In your notebook keep a record of wind direction at 9 a.m. and 4 p.m. each day for a fortnight. Note also the days on which it rains between these hours. Write a paragraph summing up what your record shows.

3. Check by your own observations the following weather sayings:

- (a) Rain before seven, fair by eleven.
- (b) Red sky at night, shepherd's delight. Red sky in the morning, shepherd's warning.
- (c) The weather will change with the new moon.
- (d) Three white frosts and then a splash.
- (e) The north wind doth blow and we shall have snow.

Make a collection of local sayings of this kind and test their truth.

4. Compare the climate of the North-West Highlands of Scotland with that of Kent and that of Galway in Ireland with that of Norfolk.

5. Are cloudy days warmer or colder than clear days (a) in summer, (b) in winter? Are cloudy nights warmer or colder than clear nights? Try to explain the facts.

6. How can you tell that the wind sometimes blows upwards or downwards as well as horizontally?

CHAPTER V

1. Village and town names are often very old and give a clue to the kind of country in which they grew. Search any large scale maps available and make lists of such names. "Wootton" and such suffixes as "hurst" and "den" or "dene" have reference to woodland conditions. Find examples and explain why they are so numerous in certain areas.

2. What was the character of the natural vegetation in your area? What evidence is there for your statement?

3. Draw a plan of (a) a local farmyard, labelling the buildings according to their use; (b) a local farm, showing the use to which each field is put.

If you mapped the fields in (b) in another year, how and why would this second map differ from the first?

4. At what time of the year does the English farmer carry out the following tasks: sheep shearing; potato lifting; ploughing; hay harvesting; wheat sowing; reaping of corn?

What implements does he use for each job?

5. Find out how butter and cheese are made from milk. Suggest reasons for these being made more often in the western districts of Britain, whereas in central and eastern districts farmers mainly sell their milk in its fresh state.

6. From what districts does your town obtain its supplies of (a) milk, (b) meat, (c) flour, (d) potatoes, (e) plums, (f) fresh vegetables?

CHAPTER VI

1. Visit a local quarry, railway cutting or cliff where bare rock is exposed. Collect specimens of the rock, the subsoil and the soil for later examination. Make a sketch to show these three layers, the way they are arranged and the bedding of the solid rock. Note the depth to which the roots of grass, shrubs and trees penetrate.

2. What different kinds of rock occur in your district? Give localities in which each can be found. For what purpose is each used?

3. How could you distinguish from one another pieces of sandstone, shale, slate and limestone?

4. What materials of mineral origin do your local builders use? From what districts are they obtained? Are the old buildings of your town made of the same materials? Explain any differences.

5. Trace the history of a tea cup from the securing of the raw materials to the time when it hangs in your mother's cupboard.

6. To what uses is coal put in your neighbourhood? From what districts is it obtained? Trace, with the help of a map, the route by which it comes.

CHAPTER VII

1. Study one of your local industries. What raw materials does it use and whence does it secure them? Through what processes are these materials put and what are the main tools or machines used at each stage? What are the chief finished products, where are they used and how are they taken there?
2. Name three British industries which have developed near the source of their raw materials, three near the source of the power used and three where there was great need of their products.
3. Write an account of one of the textile industries of Britain under the headings (a) raw materials and their place of origin, (b) place of manufacture and reasons for its choice, (c) uses to which the fabrics are put.
4. Name an important manufacturing industry associated with each of the following towns: Stoke; Newcastle-on-Tyne; Belfast; Leicester; Bradford; Swansea; Oldham.
5. Draw a map of the area surrounding Middlesbrough. On it show how and from whence are brought the raw materials for its iron and steel industry.
6. What branches of the food industry are carried on in Bristol, Hull, and London, respectively? What advantages for the industries named arise from the fact that all three are ports?

CHAPTER VIII

1. What means of transport are used to bring (a) bricks to the builders, (b) potatoes to the greengrocers, (c) coal to the gas-works, (d) petrol to the garages, (e) bread to the homes, (f) clothing to the drapers? Account for the form used in each case.
2. Make a simple sketch-map of your home district to show the railways and main roads which serve it. Indicate the chief towns reached by each route.
3. Why were most of the early developments in railway transport carried out in the coalmining areas?
4. Examine a railway map of the country round London. From it show how (a) the relief of the country, (b) the difficulty of river crossings, have affected the pattern they make.

5. Draw simple sketch-maps to show the main railway lines serving (a) Birmingham, (b) Glasgow, (c) Dublin.
6. In what parts of Britain does a railway map show close networks? Explain why in each case.

CHAPTER IX

1. Name three parts of the British Isles where the population is very scattered and three where it is very crowded. Account for the condition in each case.
2. During the war years many new factories were built in country areas. What changes followed there as a result?
3. What goods are bought and sold in your local markets to-day? Can you find any evidence of old-time markets now abandoned? What goods were handled in them?
4. Where are the markets or wholesalers from which your local shopkeepers obtain the goods they sell?
5. Describe the work which goes on in a railway goods station
6. In many modern towns most of the residential districts are on the outskirts, away from the shops and factories. How does this affect the town transport system?

CHAPTER X

1. Examine a plan of London. From it draw a simple sketch plan showing: the Thames, St. Paul's, Westminster Abbey, the Houses of Parliament, Buckingham Palace, four of the main railway termini, "Theatre land," Lord's cricket ground, one great football ground, a railway bridge, a road bridge, a great shopping street, Covent Garden and Smithfield markets.
2. Why are London's docks farther downstream than its bridges?
3. "London is Britain's shopwindow." What does this mean? How has it come about?
4. Buyers for clothing firms in New York, Cape Town, and Sydney (N.S.W.) come to London. Why do they come to Britain, and why to London, rather than to Leeds or Manchester?

5. Draw a map of the London Basin. On it show and name the rivers Thames, Lea and Wey ; the Chiltern Hills and North Downs ; London, Reading, Luton, Chelmsford, Guildford. Mark the main railway lines converging on London.

6. London is a port on an estuary. What other British ports are similarly placed ? Why has London outgrown the others ?

CHAPTER XI

1. On an outline map of England and Wales mark the following areas which have large industrial or mining populations : West Yorkshire, South Lancashire, Birmingham and the Black Country, South Wales. Show on the same map the main coastal holiday resorts used by the people of these areas.

2. Until about 200 years ago most English people lived in the south-east of the country ; afterwards the bulk of the population lived in the midlands and north. How do you account for these two facts ?

3. Compare Kent with Cornwall under the headings relief, climate, farming, products.

4. How is it that Cornwall can supply spring flowers and vegetables earlier than other parts of Britain ?

5. What conditions have helped to make Southampton the main port on our south coast ? What advantages does it possess over Plymouth ?

6. Draw a map to show how Cornish china clay reaches the North Staffordshire potteries. Why is it not manufactured in Cornwall ?

CHAPTER XII

1. Both Birmingham and Liverpool draw water supplies from mid-Wales. Account for this as fully as you can.

2. Write a paragraph on the Welsh railways and illustrate it by means of a simple map.

3. In most parts of Wales bricks have not been widely used for building houses. Why is this ?

4. Compare the basin of the river Severn with that of the Thames.

5. How does the sea trade of Cardiff differ from that of Bristol? Explain the differences.
6. Draw a sketch-map of the South Wales coalfield and on it show the rivers Taff and Neath; the ports of Newport, Cardiff, and Swansea; the inland towns of Merthyr Tydfil and Pontypool.

CHAPTER XIII

1. Draw a sketch-map of the Trent basin. Mark and name the Dove and the Derwent; Stoke, Birmingham, Burton, Derby, Nottingham and Scunthorpe. Shade and label the Potteries, the Black Country, the Jurassic Ridge.
2. What industries are particularly associated with each of the following towns: Stoke, Stafford, Burton, Coventry, Nuneaton? What locally obtained raw materials are used in each case?
3. Write an account of the Black Country. Can you suggest any reasons why it is less "black" than it was fifty years ago?
4. Draw a diagrammatic map of the English Midlands to show its main railway routes, naming the more important towns on each route. Your map should extend from Leeds and Liverpool on the north to Bristol on the south.
5. The industrial towns of the West Midlands obtain supplies of tree fruits from Worcestershire and Herefordshire, milk from the Trent and Avon valleys, fresh vegetables and soft fruits from Evesham. What conditions in each area make the supply of these foods possible?
6. How do the industries of the East Midlands differ from those of the West Midlands?

CHAPTER XIV

1. What characters distinguish an escarpment and a ridge, a plain and a lowland, a floodplain and a marsh?
2. Why are there few large industrial cities in the eastern counties of England?
3. On a map of eastern England show the main rivers; the towns of Bedford, Cambridge, Norwich, Peterborough and Lincoln; the main railways leading to London.

4. Explain as far as you can the following associations: Yarmouth and bloaters; Peterborough and bricks; Lincoln and farming implements; Wisbech and jam; Luton and hats.
5. How and why does Fenland farming differ from that in the Vale of Trent?
6. How does the climate of Norfolk differ from that of Pembroke and Caermarthen? What causes these differences?

CHAPTER XV

1. Lancashire and Yorkshire have (a) thickly populated industrial areas, (b) rich farming districts and (c) very thinly peopled districts. Show these on a simple map and explain briefly the differences between them.
2. What conditions have encouraged the farmer in the Pennine dales to produce large quantities of fresh milk?
3. What advantages for the carrying on of the cotton industry are possessed by south-east Lancashire? Which of these are absent in the West Riding of Yorkshire?
4. Draw simple sketch-maps to show the important features in the sites of (a) Leeds and Bradford, (b) Manchester and Liverpool.
5. Liverpool imports more raw wool but exports less manufactured wool textiles than Hull. How is this explained?
6. Write an account of the iron and steel industry as carried on in the Sheffield district.

CHAPTER XVI

1. Draw a map of the Scottish borderland. Show by shading the higher areas and mark the main railways. Name the rivers whose valleys are used by these routes.
2. Compare the advantages of the Tweed valley with those of the West Riding for the production of wool textiles. What other rural areas produce woollen fabrics?
3. Draw simple maps to show the important features of the positions of Carlisle, Berwick and Newcastle.
4. Write a general account of the life of the people in the Lake District of Cumberland.

5. Refer to Chapter II and then write an illustrated account of the advantages and disadvantages of the lower Tyne for ship-building.

6. Compare in as many ways as you can the Northumberland and Durham coalfield with that of South Wales.

CHAPTER XVII

1. Draw a map of the Scottish Lowlands showing its northern and southern limits and the main hill masses within those limits. Show the courses of the Tay, Clyde and Forth and mark and name Strathmore, Dundee, Perth, Stirling, Greenock, Glasgow, Leith and Edinburgh.

2. What conditions have made the estuary of the Clyde so much more important than those of the Forth and Tay? Why have long railway bridges been built across the two latter? Why is there no such bridge across the Firth of Clyde?

3. Write an account of the commerce and the industries of Dundee.

4. Edinburgh and Aberdeen, Glasgow and Dundee are the main cities of Scotland. Until the last hundred and fifty years the two former were larger and more important than the two latter. To-day this position is reversed. How do you account for this?

5. Glasgow has both a large overseas trade and a home coasting trade in foodstuffs. Write an account of each.

6. Explain as fully as you can the fact that most of the population of Scotland lives in the Lowlands.

CHAPTER XVIII

1. Draw simple maps to show the chief features of the sites of Aberdeen, Inverness, Perth and Stirling.

2. What are the characteristic features of a glen, a strath, a Scottish moor?

3. It is proposed to establish a great station to develop hydro-electric power in the Northern Highlands. What changes would you expect to follow the introduction of cheap and abundant electric power in this region?

4. What advantages and disadvantages do the Scottish fishing ports have in comparison with Yarmouth and Hull or Grimsby?
5. Describe the life of a West Highland coastal village (a) in winter, (b) in summer. In what other parts of the British Isles may similar conditions be found?
6. Why have the Scottish Highlands such poor railway communications?

CHAPTER XIX

1. Limerick, Cork and Londonderry are ports situated on estuaries. Why are they so much less important than the estuarine ports of Great Britain?
2. Describe the activities of a small market town on the Irish Plain.
3. Butter, bacon, beef are sent from Eire to Great Britain. What conditions make this export trade possible?
4. Irish imports are mainly cattle foods such as maize, human foodstuffs such as tea and sugar, and manufactured goods such as clothing and hardware. Show the importance of the trade in each group.
5. Draw maps to show the main features in the position of Dublin and Belfast and compare the activities of the two cities.
6. Write an account of either the linen industry or the ship-building industry of Belfast.

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